(26,845)

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1918.

No. 759.

ALEX. GROESBECK, CASSIUS L. GLASGOW, CHARLES S. CUNNINGHAM, AND ADDISON A. KEISER, APPELLANTS,

vs.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY.

APPEAL FROM THE DISTRICT COURT OF THE UNITED STATES FOR THE EASTERN DISTRICT OF MICHIGAN.

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a UNITED STATES OF AMERICA:

In the District Court of the United States for the Eastern District of Michigan, Southern Division. In Equity.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Plaintiff,

VS.

ALEX. J. GROESBECK, CASSIUS L. GLASGOW, CHARLES S. CUNNING-HAM, Addison A. Keiser, Morgan W. Joplin, John R. Van Evera, and Fred S. Case, Defendants.

Clerk's Return to Claim of Appeal in Above-entitled Cause from said Court to the United States Supreme Court.

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United States Circuit Court, Eastern District of Michigan, Southern Division. In Equity.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Complainant,

V.

Franz C. Kuhn, Cassius L. Glasgow, George W. Dickinson, Lawton T. Hemans, John R. Van Evera, Morgan W. Jopling, and Fred S. Case, Defendants.

Bill of Complaint.

To the Judges of the Circuit Court of the United States for the Eastern District of Michigan:

Your orator, the Duluth, South Shore & Atlantic Railway Company brings this its bill of complaint against Franz C. Kuhn, a citizen of the State of Michigan and a resident of the County of Macomb, Cassius L. Glasgow, a citizen of the State of Michigan and a resident of the County of Barry, George W. Dickinson, a citizen of the State of Michigan and a resident of the County of Oakland, Lawton T. Hemans, a citizen of the State of Michigan and a resident of the County of Ingham, also, John R. Van Evera, Morgan W. Jopling and Fred S. Case, all citizens of Michigan residing in Marquette County and who are hereby made defendants, and thereupon your orator avers:

Your orator is a consolidated railroad corporation duly created under the laws of the States of Michigan and Wisconsin, has its principal office at the City of Marquette in the State of Michigan, and is a common carrier of freight and passengers, and as

such is engaged in state and inter-state commerce, and owns, maintains and operates lines of railroad in the States of Michigan and Wisconsin, and in order to reach Duluth, operates its trains over a line of railroad of another company within the State of Minnesota. Its system of railroads, including its main line or lines and its branches, comprise about 584 miles of road owned by it, and 20.83 miles of road over which it operates its trains under agreement with other companies. About 475 miles thereof is situate within the State of Michigan. Its line extends from Sault Ste, Marie, Michigan, to Duluth, Minnesota, with a branch from Soo Junction in Luce County, Michigan, to St. Ignace, Michigan, and a branch from Nestoria, in Baraga County, to Houghton in Houghton County, Michigan, and other short branches in Michigan. It crosses the counties of Chippewa, Mackinac, Luce, Schoolcraft, Alger, Marquette, Baraga, Houghton, Ontonagon and Gogebic, in Michigan, thence westerly, from the westerly boundary of Gogebic County across the northerly portion of Wisconsin to the City of Superior, from which last named place it operates its trains as aforesaid over the line of another company to Duluth, Minnesota. The whole of its said railroad constitutes one system, and long has been, and now is, operated as such.

It has outstanding common stock of a par value of \$12,000,000 and preferred stock of the par value of \$10,000,000. Its outstanding bonds amount to \$18,923,000 covering its entire system, and \$1,077,000 covering its main line from Marquette, Michigan, to Houghton, Michigan, and its branch from Humboldt, Michigan, to Republic, Michigan, with the side tracks and other property appurtenant to such main line and branch line, being only about 104 miles of its road in Michigan. Its cars, engines, supplies and appliances are, for the most part used upon the system wherever required without regard to state lines. It is impossible to operate separately, with due regard to economy or the interests of the public, that portion of the

system of your orator situate in any particular state. To a great extent, the trains of your orator, whether freight or passenger, necessarily move between different states, and even when their movements are confined to one state, the same trains and the same cars carry both inter-state freight or passengers and intrastate freight or passengers. The principal business of your orator consists of interstate commerce, either wholly upon its own line, or jointly with other common carriers, and it is a carrier in such commerce subject to the exclusive jurisdiction, supervision and control of the Congress of the United States.

II.

The defendant, Franz C. Kuhn, is the Attorney General of the State of Michigan, duly elected, qualified and acting as such. The defendants Cassius L. Glasgow, George W. Dickinson and Lawton T. Hemans, are Commissioners constituting the Michigan Railroad Commission, duly appointed, qualified and acting as such under the general Statutes of said state creating such Commission. The above named defendants, John R. Van Evera, Morgan W. Jopling and Fred S. Case, and each of them are persons accustomed to use, and intending in the future to use, as passengers thereon, your orator's railroad between stations on said railroad within the State of Michigan. They represent a class of passengers within said state, most of whom are necessarily unknown to your orator, so numerous that it is impossible to join them all as parties hereto, and they are made defendants hereto for the purpose of determining the right of all passengers under Act 276 hereinafter referred to.

III.

Your orator represents that the Legislature of the state of Michi-

gan, at its session in 1911, enacted Public Act No. 276, entitled "An Act to amend Sec. 9 of Act No. 198 of the laws of 1873, entitled 'An Act to revise the laws providing for the incorporation of railroad, bridge and tunnel companies, and to regulate the running and management, and to fix the duties and liabilities, of all railroad, bridge, tunnel and other corporations owning or operating any railroad, bridge or tunnel within this state," the section amended being compiler's Sec. 6,234 of the Compiled Laws of the State of Michigan of the year 1897; and by the said Act 276, the said Legislature, among other things, enacted and provided that the tolls and compensation to be charged for transporting any passenger and his or her ordinary baggage, not exceeding in weight 150 pounds, should not exceed, for a distance of five miles, three cents per mile; and for all other distances for all companies the gross earnings of whose passenger trains, as reported to the Commissioner of Railroads for the year 1906, equalled or exceeded the sum of \$1,200 per mile for each mile of road operated by any such railroad company on which regular passenger service is maintained, as thereinafter provided, two cents per mile; and for all companies whose earnings, reported as aforesaid, were less than \$1,200 per mile of road operated by such company, three cents per mile. For children under twelve years of age a charge of one-half the above fares is provided. That the gross earnings of your orator's passenger trains, as reported to the Commissioner of Railroads of the State of Michigan for the year 1906, and for each subsequent year reported, exceeded the sum of \$1,200 per mile for each mile of road operated by it within the State of Michigan on which regular passenger service was maintained. Such law, if valid, as to your orator and enforced against it, will make it unlawful for your orator to charge for the transportation of passengers within the State of Michigan more than

two cents per mile, whereas now it is, and hitherto has been, allowed to charge three cents per mile, and prior to September, 1907, it was allowed to charge four cents per mile.

IV.

This is a suit in equity arising under the Constitution of the United States, for that your orator seeks to enjoin the defendants above named, and each of them, from attempting in any manner to enforce against your orator the provisions of said Act 276

prescribing the rates, fares and charges for the transportation of passengers as aforesaid, or from instituting any action or proceeding against your orator, its officers, directors, agents or employes, for the violation of such provisions, for the reason that said Act, in so far as it attempts to prescribe as against your orator and compel it to accept the rates, fares and charges in said Act prescribed, is violative of the provisions of the fourteenth amendment to the Constitution of the United States, in that it will operate to deprive your orator of its property without due process of law, and to deny to your orator the equal protection of the laws. The matter in dispute in this suit exceeds, exclusive of interest and costs, the sum of \$2,000.

V.

Said defendant Franz C. Kuhn, as Attorney General of the State of Michigan, threatens and intends to, and will, unless restrained by this court, take and institute proceedings against your orator, its officers, agents, servants and employees, to compel your orator and them to put into effect the rates, fares and charges prescribed in said Act 276, and to maintain and keep the same in effect. Said defendants Cassius L. Glasgow, George W. Dickinson and Lawton T. Hemans, as the Railroad Commission aforesaid, threaten to and will, in case your orator shall fail or refuse to put in effect, and to keep and maintain in effect, such rates, fares and charges, give to your orator the notification provided for in said Act 276; and in case your orator shall, within thirty days after such notification. fail or refuse to put in effect and maintain the rates, faresand charges. institute and cause to be instituted against your orator numerous actions, suits and proceedings for the purpose of enforcing against your orator the penalty of \$500 per day for each and every secular day during the pendency of such failure as provided in said Act

276. They threaten to and will call upon the Attorney 6 General, or the Prosecuting Attorney of each county in Michigan through which your orator's road passes, to institute and prosecute actions, suits and proceedings to compel your orator to carry out and obey the provisions of said Act 276 with reference to rates, fares and charges, and to punish your orator by the enforcement of the penalties aforesaid.

Said defendants, John R. Van Evera, Morgan W. Jopling and Fred S. Case, are members of a class, as hereinbefore stated, each

of whom will be entitled, under the provisions of Sec. 6,235 of the Compiled Laws of the State of Michigan of 1897, to commence an action, on the refusal of your orator to carry him for the rates, fares and charges named in said Act 276, to recover the actual damage sustained by him by such refusal, or, at his election, a penalty of \$100, and your orator believes and alleges that it will be harassed by, and subjected to, a multitude of such actions commenced to re-

cover such penalties.

For the determination of the validity of said rates, fares and charges as applicable to your orator and its railroad, an examination of an immense number of complicated facts is necessarily involved. It is necessary to determine the value of your orator's entire property; its value in Michigan; the proportionate value of your orator's property used and to be used for the transportation of passengers, interstate and intra-state, in Michigan; the total amount of the earnings of your orator allowable to its lines in Michigan; the amount of such earnings allowable to the freight business and to the passenger business in Michigan; the amount of earnings derived from transportation of passengers inter-state and intra-state in Michigan; and the apportionment of various miscellaneous items of earnings to the inter-state and intra-state passenger business in Michigan; the total

amount of expenses for the operation of your orator's line; the division of such operating expenses between the states in which your orator's lines are located; the division of such operating expenses between the freight and passenger business of your orator; the division of the passenger operating expenses in Michigan between the interstate passenger business and the intrastate passenger business; the apportionment of taxes paid in Michigan between the passenger business and the freight business of your orator in Michigan; the apportionment of the amount of taxes charged against the passenger business of your orator in Michigan between its intra-state and its interstate passenger business; together with other facts too numerous here to be stated, and the determination of which is most intricate and difficult, but all of which are necessary to be determined before it can be decided whether your orator will receive any or an adequate compensation from all its business, or from its intra-state passenger business in Michigan.

The accounting department of your orator's railroad has been, since the passage of Act 276, and is now, engaged in examining its accounts and determining the questions above suggested, and your orator is advised and believes, and so alleges the fact to be, that the profit from its business in Michigan will be so slight, if any, if it is compelled to accept a two cent per mile fare for the transportation of passengers, that it will amount to a confiscation of its property, and it brings this suit in good faith for a speedy and final judicial determination of the validity of the rates, fares and charges

aforesaid as applicable to your orator and its railroad.

That the average number of passengers carried by your orator each day on its lines between stations in Michigan is about 1900, and there is no reason for believing that it will be less in the future, and if

your orator should be subjected to a penalty of \$100, for each passenger whom it shall refuse to carry for two cents per mile, its lia' ility will be about \$190,000 per day, to say nothing of the \$500 per day

penalty hereinbefore referred to; and if such penalties shall be enforced, the necessary result must be to deprive your orator of the right to have a judicial determination of the validity of the rates, fares and charges aforesaid, and it would thereby be deprived of its property without due process of law, and would be denied the equal protection of the laws, all in violation of the said fourteenth amendment of the constitution of the United States.

VI.

For many years immediately last past, the general basis of fares and charges for the transportation of passengers upon the lines of your orator in Michigan, whether for traffic local to Michigan or inter-state between Michigan and another state, or between points in Michigan and points in the Dominion of Canada, has been and now is three cents a mile (except for children entitled to half fare), which fares and charges have never been excessive or unreasonably high, but on the contrary, are, and always have been, so low as not to yield, over and above the cost of doing the business, any just or reasonable return to your orator on the fair, proportionate value of its property used in the conduct of its passenger business and prop-

erly assignable thereto.

The fares for all passengers traveling on your orator's line from points within the State of Michigan to points beyond its limits, whether reached by your orator's line or by the line of a connecting carrier, for a long time last past have been and now are generally arrived at and made by taking the sum of the local fares and charges, that is, by adding three cents per mile for each mile travelled in Michigan, (except children entitled to half fare) to the amount of the local fares for the other parts of the route. example: Newberry, Michigan and Superior, Wis., are points on the main line of your orator's road 53.6 miles apart. which is now and for a long time last past has been charged by your orator between said points is \$9.50, arrived at as follows: 244.4

miles of such distance is within the State of Michigan, and at three cents per mile amounts to \$7.33; 109.2 miles of such distance is within the State of Wisconsin, which, at two cents

per mile (the local rate in Wisconsin), amounts to \$2.18.

The station of Montreal, in Gogebic County, Michigan, on your orator's line is near the Western boundary of Michigan, and 242 miles westerly from Newberry. If the fare prescribed by Act 276 shall be enforced, the fare from Newberry, Michigan, to Montreal, Michigan, can not exceed the sum of \$4.84, which, added to the fare from Montreal to Superior, \$2.18, amounts to \$7.02, being \$2.48 less than the present fare from Newberry, Michigan to Superior, Wis.

Again, Marquette, Michigan, and Lake Nebagamon, Wis., are

points on the main line of your orator's road. The present fare is \$6.00, being three cents per mile for 147.9 miles in Michigan, and two cents per mile for 79.4 miles in Wisconsin. If said Act be enforced against your orator, the fare from Marquette, Michigan, to Montreal, Michigan, a distance of 145.5 miles, cannot exceed \$2.91 and the fare from Montreal, Michigan, to Lake Nebagamon, Wis., at two cents a mile, would amount to \$1.63, aggregating \$4.54,—being

\$1.46 less than the present fare.

Still further: The present fare from the City of New York to Marquette, Michigan, via Mackinaw, is \$25.33, made up as follows: The fare from New York to St. Ignace, Michigan, a terminus on your orator's line, is \$20.80. The distance on your orator's line from St. Ignace to Marquette is 151 miles, which, at three cents a mile, amounts to \$4.53. If the rates, fares and charges in said Act 276 be enforced against your orator, the fare from St. Ignace to Marquette can not exceed \$3.02, which, added to \$20.80, amounts to \$23.82, a reduction of your orator's inter-state fare of \$1.51.

The rates, fares and charges for the passenger business of your orator, made up of travel between points on your orator's line within the State of Michigan, and points beyond the limits of the State of Michigan, are made, filed and published in accordance with the requirement of the Act to regulate commerce and the

10 amendments thereto, and are the only rates, fares and charges which may legally be applied to such passenger business. The direct and immediate effect of the installation of the rates, fares and charges prescribed in said Act 276 will be to deprive your orator of a substantial part of its inter-state passenger business between points on its line in the State of Michigan, and points beyond the limits of the State of Michigan, because the fares and charges for transportation of a passenger, a part of whose route is partly within and partly beyond the limits of Michigan, will then necessarily exceed the sum of the fares and charges for which such passenger may travel on local tickets. And while your orator is unable to learn definitely how much of its said inter-state passenger business will be so destroyed by the application of such rates, fares and charges on account of the purchase of local tickets on your orator's line between points in Michigan, being a part of inter-state travel, its officers believe, and so it avers the fact to be, that the amount thereof will be the greater part of its interstate passenger business.

The immediate, direct and necessary effect of the installation of the rates, fares and charges prescribed in said Act 276 will be to create unfair and unjust discrimination in favor of the passenger business of your orator local to the State of Michigan and against all its passenger business between Michigan and another state, or between Michigan and Canada, or which is made up of travel and routes partly within and partly beyond the limits of Michigan, and also unfair and unjust discrimination in favor of localities on your orator's line within the State of Michigan, and against localities beyond the boundaries of the State of Michigan.

The unavoidable effect of the reduction of the intrastate passenger

rates, fares and charges in said Act 276 prescribed to the business of your orator in Michigan, will be substantially to burden, and directly to regulate and to discriminate against, the inter-state passenger com-

merce of your orator, and to create undue and unjust discrimination between localities in Michigan and those in other states, in violation of the commerce clause of the Constitution of the United States, and in violation of the Act of Congress to Regulate Commerce among the States and with Foreign Nations, and the amendments thereto, commonly known as the "Interstate Commerce Act."

VII.

The roads of your orator are well and judicially located, were built in obedience to public necessity, and are now, and always have been, well and economically operated. They are not equipped or constructed with reference to any other business than that which your orator is now doing, and that which it may reasonably expect to have within the near future.

Its property used in the conduct of its transportation business, is all located in the States of Michigan and Wisconsin. Its property used in the transportation business in the State of Wisconsin is reasonably of the value of not less than \$2,430,000, and could not be reproduced for that sum.

Its property devoted to its transportation business within the State of Michigan is now, and for several years last past has been, actually, fairly and reasonably of the value of not less than \$11,000,000 and could not be reproduced for that sum.

The proportionate value of its said property within the State of Michigan, which now and for some years past has been fairly and justly chargeable and assignable to the total freight business of your orator therein, does not exceed \$7.400,000.

The proportionate value of said property within the State of Michigan which now and for some years past has been fairly and justly chargeable and assignable to the total passenger business of your orator in Michigan, is at least \$3.600,000.

The proportionate value of its said property within the State of Michigan which now and for some years last past has been fairly and justly chargeable and assignable to the intrastate passenger business of your orator within Michigan, which is covered by the rates, fares and charges in said Act 276 prescribed, is at least \$2,048,000.

The fiscal year ending June 30, 1910, may justly be taken to be a fairly representative year, and a guide by which to determine what the net income of your orator from its various classes of business, as well as upon its entire railroad as from its business within Michigan, has been in recent years, and what the same will be in the future.

In said fiscal year the total operating revenue of your orator, both freight and passenger, including all miscellaneous earnings of every kind, did not exceed the sum of \$3,302,147.03.

In said fiscal year the total operating revenue of your orator within the State of Michigan, both freight and passenger business,

including all miscellaneous earnings of every kind properly allowable to said state, did not exceed the sum of \$2,896,602.50, of which not to exceed \$1,940,388.04 was derived from, and assignable to, the freight department of the business in Michigan, and not to exceed \$956,214.46 was derived from and assignable to, the passenger department of the business in Michigan, and not to exceed \$539,502.50 was Michigan intra-state passenger earnings, including a just proportion of all miscellaneous earnings.

The total operating expenses and taxes in said year were not less

than \$2,491,778.16.

The total operating expenses and taxes properly chargeable to all of the business within the State of Michigan in said year, was not less than the sum of \$2,120,950.09, of which operating expenses and taxes there was properly chargeable to the freight department of the business within Michigan not more than \$1,419,536.38, and to the passenger department of the business in Michigan not less than \$701,-413.71.

Of the total amount of the operating expenses and taxes properly chargeable to the passenger department of the business within Michigan in said year, there were properly chargeable to the intra-state

passenger business in Michigan not less than \$426,956.42.

The total net income, over and above operating expenses and taxes, derived from the total business of your orator of all kinds in said year, including outside operations, rentals and hire of

equipment, did not exceed the sum of \$794,395.23.

The total net income over and above operating expenses and taxes derived from the total business of all kinds, including outside operations, rentals and hire of equipment, in Michigan in said year, did not exceed the sum of \$770,694.92, and that derived from, and assignable to, the business of the passenger department in Michigan in said year did not exceed the sum of \$256,920.10, and the total net income derived from the intra-state passenger business in Michigan in said year,—including a fair and just proportion of miscellaneous earnings, outside operations, rentals and hire of equipment,—did not exceed the sum of \$113,740.14.

For many years prior to, and until 1907, your orator was by law allowed to charge four cents per mile for passenger travel in Michigan (except for children under twelve years of age). By a statute passed in 1907, taking effect in September of that year, this rate was

reduced to three cents per mile.

Your orator has always transported children under the age of twelve years and clergymen on its line at one-half the regular fare, and has frequently granted excursion and party rates upon which large numbers of passengers have traveled at less than the regular fare, and competitive conditions have long existed, and will continue to exist, rendering it impossible for your orator to secure its maximum regular fares on certain of its business.

The number of passenger miles on your orator's whole line, and the average amount of revenue per passenger mile in each year end-

ing June 30th, for the last four years, is as follows:

1907	******************************	40,284,349	\$0.02662
1908		39,627,046	.02446
1909		37,924,125	.02413
1910		40,128,377	.02463

The number of passenger miles on your orator's line in Michigan, and the average amount of revenue per passenger mile in each year ending June 30th, for the last four years, is as follows:

1907		. 33,256,965	\$0.02785
1908	************************	. 32,438,206	.02590
1909		. 31,145,196	.02541
1910	***************************************	. 32,813,258	.025432

In 1910 the total number of passenger miles in the intra-state passenger business of your orator in Michigan was 18,358,957, and the average revenue per passenger mile was .02563 cents, and the total number of inter-state passenger miles in Michigan was 14,454,301, and the average revenue per passenger mile was .02518 cents.

There is no reason to believe that the passenger traffic on your orator's whole line, or its lines in Michigan, will increase substantially in the near future, for the reason that the territory served by such railroads in the northerly parts of Michigan and Wisconsin is sparsely settled, the population being in the Upper Peninsula of Michigan only about sixteen persons per square mile as against more than forty-two persons per square mile in the Lower Peninsula of Michigan, as your orator is informed and believes. If the rates, fares and charges prescribed in Act 276 be enforced against your orator, it will be impossible, because of the facts hereinbefore alleged, to secure an average of two cents per passenger mile upon its traffic in Michigan, and your orator believes that it will be impossible to secure more than one and eight-tenths cents per passenger At the average revenue of one and eight-tenths cents per passenger per mile on the volume of traffic of 1910, the diminution of its revenue would amount to \$243,868.13 per year in Michi-Assuming that it would be possible to secure two cents per passenger per mile on the average, the diminution of revenue, on the volume of traffic in Michigan in 1910, would be, on interstate passenger business, \$103,360.93, and on the inter-state passenger business, \$74,873.28; making a total of \$178,234.21. If the earnings of your crator's entire line for the year 1910 were reduced by the amount

last above mentioned, the return on the entire value of your orator's operating property would not exceed 4.59%, and if its total earnings in Michigan were reduced by the like sum, the return on the value of your orator's entire property in Michigan would be only 5.39%, and if the intrastate passenger earnings in Michigan be reduced \$103,360.93, then the rate of return upon the proportionate value of your orator's property used in the conduct of such business and properly assignable thereto, would be less than .506%.

The cost of operation of your orator's lines has not declined within recent years, but, on the contrary, has advanced because of increase in the wages of all classes of laborers and other employes, and the advance in the price of many classes of material required for the operation of the road. The operating expenses per passenger per mile of all passenger business in Michigan, or of the Michigan intra-state passenger business, will not decline but will advance, as the officers

of your orator believe and so it alleges the fact to be.

The condition of the property of your orator used in its transportation business for a long time has been—and will continue to be—such as to require large annual expenditures to make up depreciation of property, not formerly included in operating expenses or otherwise provided for, and also for betterments and additions required to enable your orator to discharge its duties to the public. Large sums of money have, in recent years, been taken from the operating income of your orator to make up for depreciation prior to 1907, and for additions and betterments.

Your orator has never paid any dividends upon any of its outstanding capital stock, and has only paid a comparatively small part of the interest accruing upon its bonds outstanding. The annual interest on such outstanding bonds is \$859,700., amounting in the last five years to \$4,298,500., but the annual payments on account thereof during such period of five years has been \$255,420., except that in the year 1909 it paid \$395,420., making the aggregate of all pay-

ments for the five years of \$1,417,100.

The reduction of the rates, fares and charges prescribed by Act 276—even if the same be confined solely to the intra-state passenger business of your orator in Michigan,—will result in depleting its revenue so that it will not derive from such intrastate passenger business, over and above taxes and the fair or actual cost of doing the business, any fair or reasonable return upon the proportionate value of its property in Michigan necessary, for, and used in, the conduct of its intra-state passenger business therein which the rates, fares and charges prescribed in said Act specifically cover. Such rates, fares and charges as applicable to your orator and its business are unreasonable and too low, and the enforcement of the same against your orator will result in depriving it of its property without due process of law, and will deny to it the equal protection of the laws, in violation of the fourteenth amendment of the Constitution of the United States, and therefore the said Act is, as to your orator, null and void.

VIII.

Your orator has no remedy at law, and unless the defendants and each of them, be by a temporary restraining order restrained, and thereafter temporarily and permanently enjoined, as hereinafter prayed, it will suffer great and irreparable loss and damage.

IX.

In consideration whereof, and forasmuch as your orator is remediless in the premises by the strict rules of the common law, and can have relief only in a court of equity where matters of this kind are properly cognizable and relievable, and where only questions of this sort may properly be tried and determined,

Your orator prays, 1, That said Act of the Legislature of Michigan approved May 2, 1911—being Act No. 276 aforesaid,—insofar as it attempts to prescribe compensation for transporting passengers and their baggage at less than four cents per mile for a dis-

tance not exceeding ten miles, or less than three cents per mile for all other distances for passengers twelve years of age or more, and one-half those rates for children of twelve years or under, be declared and adjudged to be in violation of the Constitution of the United States, and therefore void and of no effect, so far as your orator, the Duluth, South Shore & Atlantic Railway Company, its officers, directors, agents and employes, are concerned:

2. That said Franz C. Kuhn, the Attorney General of the State of Michigan, be temporarily, until the final determination of this suit, and thereafter permanently, restrained and enjoined from instituting, or causing to be instituted, in the name of the state, his own name, as Attorney General or otherwise, any suit, action, or proceeding, to compel your orator, its officers, directors, agents or employes, to put in force, or to maintain or keep in force on the lines of your orator, any of the rates, fares or charges in said Act 276 prescribed, or for the recovery of any penalty on account of any failure or refusal on the part of your orator, its directors, officers, agents or employes, to put in force or to apply such rates.

3. That the defendants Cassius L. Glasgow, George W. Dickinson and I awton T. Hemans, individually and as Commissioners constituting the Michigan Railroad Commission, be temporarily, until the final determination of this suit, and thereafter permanently, restrained and enjoined from in any manner enforcing or attemptig to enforce against your orator, its officers, directors, agents or employes, the rates, fares and charges prescribed in said Act 276, or attempting to enforce or collect any penalty on account that your orator fails or refuses to put in effect such rates, fares and charges, either by giving the notification referred to in subdivision Ninth of said Act, or by requesting or directing the Attorney General, or the

Prosecuting Attorney of any County of the State of Michigan, to institute or prosecute any suit, action or proceeding for the purpose of compelling your orator to put in force, or keep in force, the said rates, fares and charges, or by requesting or directing them, or either of them, to institute any action, suit or proceeding to collect or enforce any penalty for the refusal to put in force such rates, fares and charges.

4. And that the defendants John R. Van Evera, Morgan W. Jopling and Fred S. Case, and all other persons who desire to become passengers on your orator's railroad in Michigan, be temporarily and

permanently enjoined and restrained from demanding that the rates, fares and charges prescribed by said Act be given to them or any of them, and from asking, claiming or demanding, in or by any suit, action or proceeding whatsoever, any damages or penalty from or against your orator, its officers, directors, agents and employes or employe, on account of any failure or refusal to give them or either of them, or to put in effect and maintain the said rates, fares and charges;

5. And that your orator have such other and further relief as may

be meet and proper, and conformable to equity.

6. And may it please your Honors to grant unto your orator a writ of subpœna of the United States of America, issuing out of and under the seal of this Honorable Court, directed to the said Franz C. Kuhn, Cassius L. Glasgow, George W. Dickinson, Lawton T. Hemans, John R. Van Evera, Morgan W. Jopling, and Fred S. Case, commanding them, and each of them, on a day certain therein to be named, and under a certain penalty, to be and appear before this Honorable Court, then and there to answer, but not under oath (answer under oath being expressly waived), all and singular the premises, and to stand to, and perform, and abide by such order, direction and decree, as may be made against them in the premises.

7. And that pending the hearing on the application for interlocutory injunction under the provisions of the Act of Congress approved June 18, 1910, a temporary order may be issued restraining the said defendants, and each of them, as above

prayed.

And your orator will ever pray.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, By ARCH B. ELDREDGE,

Its Vice-President.

A. B. ELDREDGE,

Marquette, Mich.;
PIERCE BUTLER,

St. Paul, Minn.,

Solicitors for Complainant.

JARED HOW,

WILLIAM D. MITCHELL,

Of Counsel, St. Paul, Minn.

20 STATE OF MICHIGAN, County of Marquette, ss:

I, Arch B. Eldredge, on oath, say that I am a Director, the Vice-President and General Attorney of the Duluth, South Shore & Atlantic Railway Company, the complainant above named, and one of its Solicitors herein; that I have read the foregoing bill of complaint, and know the contents thereof; that the same is true of my own knowledge, except as to those matters therein stated upon informa-

tion and belief, and as to those matters I believe it to be true; that I have subscribed the said bill and made this verification by authority from the said complainant.

ARCH B. ELDREDGE.

Subscribed and sworn to before me this 24th day of July, 1911.

[NOTARIAL SEAL.]

W. J. ELLISON,

Notary Public in and for said County.

Notary Public in and for said County.

My commission expires Jany. 27th, 1912.

Filed July 26th, 1911. MARTIN J. CAVANAUGH, Clerk.

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Order Extending Time for Return on Order to Show Cause, etc.

At a Session of the Circuit Court of the United States for the Eastern District of Michigan, Continued and Held, Pursuant to Adjournment, at the District Court-room, in the City of Detroit, in said District, on Tuesday, the Twenty-sixth Day of September, in the Year of our Lord One Thousand Nine Hundred and Eleven.

Present: The Honorable Loyal E. Knappen, United States Circuit Judge; the Honorable Arthur C. Denison, United States District Judge, and the Honorable Alexis C. Angell, United States District Judge.

No. 4117.

THE DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Complainant,

VS.

Franz C. Kuhn, Cassius L. Glasgow, George W. Dickinson, Lawton T. Hemans, John R. Van Evera, Morgan W. Joplin and Fred S. Case, Defendants.

In this cause on reading and filing stipulation by and between counsel for respective parties, and on motion of A. B. Eldredge, Esq., solicitor for complainant, and Franz C. Kuhn, solicitor for defendants named, it is by the court now here ordered that the hearing upon the order to show cause, made and entered herein on the 26th day of July, A. D. 1911, by the Honorable Alexis C. Angell, District Judge, be and the same is hereby adjourned until the 16th day of January, A. D. 1912, unless the so-called Minnesota Rate Case, now pending in the Supreme Court of the United States and set for hearing on the 10th day of October, A. D. 1911, shall have been sooner decided, in which case either party shall be at liberty to move the court to advance the day of hearing.

And it is further ordered, in accordance with said stipulation, that the restraining order issued on the said 26th day of July, A. D., 1911, by the said Honorable Alexis C. Angell, District Judge, shall be continued in force until the hearing above provided for.

And it is further ordered, that after the 20th day of October, A. D., 1911, the said Complainant issue to each person buying Michigan intra-state passenger transportation, a receipt, certificate, or agreement, in form approved by the Attorney General of the State of Michigan, by which it binds itself to refund any amount paid for such transportation in excess of two cents per mile, and in case of children under twelve years of age in excess of one cent per mile, if this court shall finally decree that the rates, fares and charges provided for in Act of the Legislature of the State of Michigan, approved May 2nd, 1911, and known as Act number 276 of that year, is valid and enforceable against the said Complainant.

(Sgd.) LOYAL E. KNAPPEN,

(Sgd.) United States Circuit Judge.
ARTHUR C. DENISON,
United States District Judge.

(Sgd.) ALEXIS C. ANGELL, United States District Judge.

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3.

Answer.

UNITED STATES OF AMERICA:

The Circuit Court of the United States for the Eastern District of Michigan, Southern Division. In Equity.

No. 4117.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Complainant,

VS.

Franz C. Kuhn, Cassius L. Glasgow, George W. Dickinson, Lawton T. Hemans, John R. Van Evera, Morgan W. Jopling and Fred S. Case, Defendants.

The defendants Franz C. Kuhn, Cassius L. Glasgow, George W. Dickinson and Lawton T. Hemans, reserving to themselves all right of exception to the said bill of complaint, and without intent to represent or to answer for or to bind the state of Michigan in any way, for answer thereto say:

(1) That they admit the things stated in paragraph I of said bill of complaint to be substantially true as therein set forth, except that they have no knowledge or information upon whether the principal business of the complainant consists of inter-state commerce, but leave the complainant to its proofs with regard thereto. (2) That they admit the statements contained in paragraph II of said bill of complaint to be substantially true as therein made, except that they have no knowledge with regard to the three defendants, John R. Van Evera, Morgan W. Jopling and Fred S. Case or the facts stated with reference to such defendants, but that they believe, upon such information as they now have, the things stated with regard to the said defendants to be true.

(3) That they admit the statements contained in paragraph III of said bill of complaint to be substantially true as therein made, except that for distances in Michigan not exceeding five miles three cents per mile may under said Act 276 of the Public Acts of 1911, be charged for the carriage of passengers over twelve years of age, and one-half of that amount for children

of the age of twelve years or under.

(4) That they admit that if this proceeding is properly instituted and is not a suit against the state of Michigan, it is a suit in equity arising under the Comstitution of the United States, and that the matter in dispute exceeds, exclusive of interests and costs the sum of \$2,000, but that they deny that said Act 276 of the Public Acts of 1911, is violative of the provisions of the Fourteenth Amendment to the Constitution of the United States or that it will operate to deprive the complainant of its property without due process of law, or to deny to it the equal protection of the laws, and aver that the

said act is constitutional and valid.

(5) That they admit that the said defendant Franz C. Kuhn, intends to and will, unless restrained, proceed against the complainant and its representatives to compel it and them to put and keep in effect the rates, fares, and charges prescribed in said act; that he admits that the defendants, Glasgow, Dickinson and Hemans will give (and have already given) to complainant the notice provided for in said act in case the complainant fails or refuses to put into effect and maintain the said rates, fares and charges, and will cause proceedings to be instituted for the recovery of the penalty provided for by statute; that they admit that persons entitled to travel over said railroad of complainant at the rates, fares and charges fixed in said act, are entitled in case of refusal to carry at such rates and charges, to proceed against the complainant for the penalty fixed by statute for the refusal to carry at such rates and charges; that they believe that the persons named are members of

the class entitled to bring such proceedings, though they have no direct information thereon, but that they deny that the complainant will be harassed by or subjected to, a multitude of such actions commenced to recover penalties; that they admit that the determination of the validity of the rates, fares and charges where the validity is contested involves the examination of a large number of complicated facts, and that in order to say positively that such rates are sufficient and accord to the complainant a fair return upon the value of its property, it is essential to determine and know the value of complainant's entire property, its value in Michigan, the proportionate value thereof used and to be used for the transportation of inter-state and intra-state passengers in Michigan, the amount

of earnings accruing to the complainant upon its line in Michigan, and the amount thereof derived from inter-state and intra-state transportation in Michigan respectively, the detailed amount of expenses for the operation of complainant's line and the division thereof between the states in which such line is located, together with numerous other facts and things bearing upon the amount of complainant's property in Michigan and the amount of earnings which will be permitted thereon from the intra-state business, all of which are necessary to be determined before it can be decided that the complainant will not receive any or adequate compensation from all of its business or from its intra-state business in Michigan, but that they deny that it is essential to ascertain and determine the amount of earnings allowable to the freight and passenger business in Michigan as separate and distinct items, the amount of earnings derived from the transportation of intra-state and inter-state passengers in Michigan separate from the earnings derived from all transportation in Michigan or the apportionment of various miscellaneous items to the inter-state and intrastate passenger business in

Michigan or the division of the operating expenses between 26 the freight and passenger business of the complainant or the division between the inter-state and intra-state passenger business separate and apart from the entire intra-state business of the complainant in Michigan, or the apportionment of taxes paid in Michigan between the passenger business and the freight business of complainant in Michigan, or the apportionment of the amount of taxes charged against the complainant in Michigan between its intrastate and inter-state business as separate items from its entire intrastate business including both freight and passenger business in Michigan, but avers that the question for determination in ascertaining the reasonableness of the rates, fares and charges permitted to be charged by the complainant involves the inquiry of whether upon the entire property of the complainant devoted to its intra-state transportation and from business in Michigan a fair and sufficient return will be paid.

That they have no knowledge or information as to the examination which is being conducted by the accounting department of the complainant's railroad, but believe that such examination is being conducted, and that they deny that the profit from the complainant's business in Michigan will be so slight that the carriage of passengers at the rates fixed in said Act 276 of the Public Acts

of 1911, will amount to a confiscation of its property.

That they deny that the average number of passengers carried by complainant daily on its line between stations in Michigan is about 1900, and that there is no reason for believing that it will be less in the future, but deny that if the complainant is in good faith and for the preservation of what defendant's representatives honestly believe to be its rights, institutes an inquiry or proceeding to determine the sufficiency of the rates, fares and charges, it would be subjected to a penalty of \$100.00 a day to each passenger whom

it shall refuse to carry at two cents per mile, and deny that its liability therefore will be \$190,000 per day, and deny that the necessary result of such penalty will be to deprive complainant of the right to a judicial determination of the validity of said rates and charges, or that it would therefore or thereby be deprived of its property without due process of law, or be denied the equal

protection of the laws.

(6) That in so far as the said bill refers to the basis for fixing rates, fares and charges for the transportation of passengers as being three cents per mile, and in so far as it refers to specific fares between the points designated in the said paragraph or refers to the assignment now made of the revenues upon inter-state traffic between Michigan and other states or to the propriety of such assignment as is made in said bill, they have no knowledge, information or belief, but leave the complainant to its proofs with regard thereto, except that they aver and charge that the direct or necessarily incidental result of the said reduction of rates will not be to reduce to any extent the inter-state rates, and that the laws of Michigan since 1907 have fixed three cents per mile as the rate for the carriage of passengers, except children entitled to travel at half fare within the territory traversed by the complainant's lines, and that before 1907 four cents per mile was the charge permitted by statute, and they deny that such rates, fares and charges have never been excessive or unreasonably high and that they have always been so low as not to yield, over and above the cost of doing the business, any just or reasonable return to complainant on the fair proportionate value of its property used in the conduct of its passenger business and properly assignable thereto.

That they admit that the rates, fares and charges for the passenger business of the complainant made up of travel between 28 points on its line within Michigan and points beyond the

limits of Michigan are made, filed and published in accordance with the requirements of the act to regulate commerce as amended, and are the only rates, fares and charges which may be legally applied thereto; they deny that the direct and immediate or necessarily incidental effect of the installation of the said rates, fares and charges so prescribed in said Act 276 will be to deprive complainant of a substantial part or any part, of its inter-state passenger business between points on its line in Michigan and points outside of Michigan, for the reasons stated in said bill or for any other reason and deny that a large part or any part of the complainant's inter-state passenger business will be destroyed, or the earnings therefrom decreased, by the application of the rates, fares and charges fixed in said act 276, or that the amount thereof will be the greater part of its interstate passenger business, or that if the said complainant is forced by the application of said act to carry any or all of its interstate passenger business at lower rates than it now receives therefor, that such reduction constitutes or will constitute a valid objection to the validity of said act.

That they deny that the immediate, direct and necessary or necessarily incidental effect of the installation of the rates, fares and charges prescribed in said act 276 will be to create unfair and unjust discrimination in favor of the passenger business of complainant local to the state of Michigan, and against all its passenger business between Michigan and other states, or between Michigan and Camara, or which is made up of travel and routes partly within and partly without said state, or that the same will constitute unfair and unjust discrimination in favor of localities on complainant's line within Michigan, and against localities outside thereof.

That they deny that the unavoidable effect of the reduction of the intra-state passenger rates, fares and charges in said act 276 prescribed, upon the business of the complainant in Michigan will be substantially to burden and to discriminate against the inter-state passenger commerce of complainant, or create undue and unjust discrimination between localities in Michigan and those in other states in violation of the said Constitution or laws of the United

States.

(7) That the statements contained in paragraph VII of the said bill relate, for the most part, to matters not within the knowledge of the defendants, and with regard to which they have no information, but which are peculiarly and particularly within the knowledge of the complainant; that the statements made in such paragraph depend largely, and almost entirely, upon facts, accounts and figures in the possession and under the control of the complainant, and to which these defendants have not had, nor been offered, access as original sources of information; that the knowledge of the truth of the statements made in said paragraph depend almost entirely upon the examination of intricate and complicated accounts which are only in the possession of the complainants and upon the making of extensive examinations of the complainant's books, papers and property; that none of these defendants have ever made, and have not been given leave by the complainant to make, such examination, and they have not, since the filing of said bill had any opportunity to make the same; that the only information which these defendants have with regard to the statements made and the facts upon which the same are based is that which is derived from the reports made by the said complainant to public officials and that resulting from examinations of its property made a number of years ago by the representatives of the state for the purpose of placing values thereon for taxation in Michigan, and that they believe upon such examination and knowledge so acquired that many of the statements made in said paragraph

are untrue both as statements of facts and as conclusions drawn therefrom; that they believe from such examination as they have been able to make and charge the truth to be that the statements contained in said paragraph, whether taken separately or collectively, do not fully or fairly represent the facts or state the truth; that the things and conclusions stated in said paragraph are in all instances stated in such a manner as to appear to be, and to be, of the most advantage to the complainant, and that many things might properly be and should be added to the statements made and things stated which, if stated, would change the character, import and effect of those stated, and for those reasons these defendants deny each and

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all of the statements contained in the said paragraph numbered VII of said bill, and leave complainant to its proofs with regard thereto.

That in addition the defendants specifically deny that the value of the complainant's property devoted to its transportation business in Michigan is row and for several years last past has been actually, fairly and reasonably of the value of \$11,000,000, or that the same could not be reproduced for that sum if proper allowance were made for depreciation, and deny that the proportionate value of the complainant's property within Michigan which now and for some years past has been, fairly chargeable and assignable to the total passenger business of complainant in Michigan, is at least \$3,600,000, and deny that the proportionate value of its said property within the state of Michigan which now and for some years past has been fairly and justly chargeable and assignable to the intra-state passenger business of complainant within Michigan which is covered by the rates, fares and charges in said act 276 prescribed, is at least

\$2,048,000, and deny that the total operating revenue of the complainant, both passenger and freight including all miscel-

laneous earnings of every kind, did not for 1910 exceed the sum of \$3,302,147.03, or that the revenues in Michigan did not exceed \$2,896,602.50, or that the said revenue is in said paragraph properly assigned between the freight and passenger business of the complainant in Michigan or between the inter-state and intrastate passenger business of the complainant in Michigan, and deny that in said year the total operating expenses and taxes of the complainant equaled \$2,491,778.16, or that the same are properly assigned in said paragraph to the Michigan business, or between the freight and passenger business in Michigan or between the interstate and intra-state passenger business in Michigan, and they deny that the total net income over and above operating expenses derived from the total business of complainant, including outside operations, rental and hire of equipment did not exceed \$794,395,23, or that said net income is in said paragraph properly assigned to Michigan in the sum of \$770,694.92, and that the true income in Michigan did not exceed that sum, and that the net income is properly assigned in said paragraph between the passenger and freight departments in Michigan, or between the inter and intra-state passenger business in Michigan, and that the total net income derived from the intra-state passenger business in Michigan including a fair and just proportion of miscellaneous earnings, outside operations, rentals. and hire of equipment, did not exceed \$113,740.14; that they deny that there is no reason to believe that the passenger traffic on the complainant's lines in Michigan will increase substantially in the near future for the reasons stated in said paragraph or for any other reasons, or that upon the rates, fares and charges prescribed in said act 276, it will be impossible to secure an average of two cents par passenger mile upon its traffic in Michigan, or more than 1.8 cents

per passenger mile, and deny that the putting into effect of said rates will result in the diminution of revenue stated in said paragraph or of any diminution of revenue, but that these defendants believe that the putting into effect of said rates will result in an increase in the number of passengers carried, sufficient to offset any loss by the reduction of rates, upon the number of passengers now carried, and deny that the putting into effect of said rates will result in such a reduction of complainant's revenues from its intrastate passenger business that it will not derive from such business after the payment of taxes and expenses of doing such business, any fair or reasonable return upon the proportionate value of its property in Michigan necessary for and used in the conduct of its intra-state passenger business, and deny that such rates, fares and charges as applicable to complainant and its business are unreasonable or too low or that the enforcement of the same against complainant will deprive it of its property without due process of law, or deny to it the equal protection of the laws or violate the Fourteenth Amendment.

That they admit that the complainant was, prior to 1907, by law permitted to charge four cents per mile for passenger travel, in Michigan, except for children under the age of twelve years, and that a statute taking effect in September 1907, reduced this rate to three cents per mile; that complainant has always transported children under the age of twelve years and clergymen at one-half the regular fare, and has given excursion and party rates to a considerable number of passengers at less than the regular fare, and that competitive conditions have existed which have rendered it impossible for the complainant to secure its maximum regular fares on certain of its business, but denies that said competitive conditions will be such as to require the complainant in future to carry any of its passengers, except children, at less than two cents per mile as

prescribed by statute.

That they aver that the fair and reasonable value and cost of reproduction and allowing for depreciation, of the property of complainant, devoted to its business in Michigan, is the sum of \$9,600,000; that the rates permitted to complainant in Michigan will pay an ample and sufficient return thereon after the payment of all expenses properly chargeable against the same, and that the earnings upon its passenger business at the rates fixed in act 276 will be ample and sufficient to pay a fair and reasonable return upon the value of such portion of the complainant's property in Michigan as is devoted to its intra-state passenger business.

(8) That they deny the statements contained in paragraph VIII

of said bill.

(9) These defendants further answering, respectively represent

and show:

(a) That this proceeding is in effect a suit against the State of Michigan, and that he, whether as Attorney General or member of the railroad Commission, has no personal interest in the said statute or in the subject matter of said bill, except as an officer of and representing the state of Michigan.

(b) That the said rates permitted by said act to be charged for the carriage of passengers are, together with the other moneys and income permitted to be earned by the complainant in Michigan, sufficient to constitute a fair and sufficient return upon the value of its property in Michigan devoted to the public service and upon the property engaged in its passenger business, and that the said act 276 of 1911 fixing rates for the carriage of intra-state passengers within the state of Michigan at two cents per mile is valid, legal and constitutional.

(c) That by reason of the reduction of passenger fares upon the line of the said complainant in Michigan from the sum of three cents per mile as heretofore to two cents per mile, will

result in stimulating the traffic and so increasing the business of complainant within the state of Michigan as to make up for any loss which may result upon specific passengers from the reduction to two cents per mile, and that a fair trial of the said rates by putting them into effect will, in the judgment of each of these defendants, demonstrate that said reduction will result in an increase rather than a decrease of earnings from the passenger business.

(d) That said complainant has not stated such a case as entitles it to the relief prayed for, and that the said bill should be dismissed with costs.

FRANZ C. KUHN.
C. L. GLASGOW.
G. W. DICKINSON.
LAWTON T. HEMANS.

FRANZ C. KUHN, GEORGE S. LAW, ROGER I. WYKES, Solicitors for Defendants.

Filed Dec. 2, 1911.

M. J. CAVANAUGH, Clerk,

4.

UNITED STATES OF AMERICA:

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The Circuit Court of the United States for the Eastern District of Michigan, Southern Division. In Equity.

No. 4117.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Complainant,

VS.

Franz C. Kuhn, Cassius L. Glasgow, George W. Dickinson, Lawton T. Hemans, John R. Van Evera, Morgan W. Jopling and Fred S. Case, Defendant-.

The Replication of the Duluth, South Shore & Atlantic Railway Company, Complainant, to the Answer of the Defendants Franz C. Kuhn, Cassius L. Glasgow, George W. Dickinson, and Lawton T. Hemans.

This repliant, saving and reserving to itself all and all manner of advantage of exception, which may be had and taken to the manifold errors, uncertainties, and insufficiencies of the answer of the said defendants, for replication thereunto, saith, that it doth and will aver, maintain, and prove its said bill to be true, certain and sufficient in the law to be answered unto by the said defendants, and that the answer of the said defendants is very uncertain, evasive, and insufficient in law, to be replied upon by this repliant; without that, that any other matter or thing in the said answer contained, material or effectual in the law to be replied unto, confessed or avoided, traversed or denied, is true; all which matters and things this

36 repliant is ready to aver, maintain, and prove as this honorable court shall direct, and humbly prays as in and by its said

bill it has already prayed.

A. B. ELDRDEDGE, PIERCE BUTLER, Solicitors for Complaint.

Dated, December 22, 1911.

Filed, Dec. 26, 1911.

MARTIN J. CAVANAUGH, Clerk.

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In the District Court of the United States, Eastern District of Michigan, Southern Division. (In Equity.)

(Former C. C. No. 4117.)

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Complainant,

VS.

Franz C. Kuhn, Cassius L. Glasgow, George W. Dickinson, Lawton T. Hemans, John R. Van Evera, Morgan W. Jopling and Fred S. Case, Defendants.

Order Appointing Special Master.

This cause came on for hearing on the 17th day of May, 1912, upon the motion of complainant that a Special Master be appointed and that a time for taking the testimony herein be fixed. Mr. A. B. Eldredge, Mr. Pierce Butler appeared for the complainant. Mr. Franz C. Kuhn, the Attorney General, and Mr. Roger E. Wykes appeared for the defendants, and after hearing the parties and due consideration, it is ordered that Herbert L. Baker, of Detroit, Michigan, be and he is hereby appointed Special Master in Chancery in this case.

The Special Master hereby appointed is empowered and directed

to take and report to the Court the evidence in this cause.

The Special Master hereby appointed is empowered and directed to examine the evidence, to make the necessary computations, and to find and state the facts in this case, and to make a report to this Court of the facts so found and of the results of such computations, and to recommend to the court in his report a form of a proper decree herein, all pursuant and subject to the fules and practice in equity.

It is further ordered that, upon the completion of his findings of fact and report, the Special Master shall notify counsel for the respective parties thereof, and shall exhibit said report to them, and shall deliver to them copies thereof, that each of the parties to this suit may thereupon file exceptions to the report with the Master within thirty (30) days after notice of its completion, and the Master

shall thereupon consider and sustain or overrule each of said exceptions, and shall thereafter return to the Court his report,

the said exceptions, his rulings thereon, and any modifications of or additions to his report he may deem it just and proper to

make, in view of such exceptions,

Upon the filing of such report and exceptions, the cause shall stand for hearing before the Court upon the said exceptions, as though they had been made at the time specified in Rule 83 in Equity, but further exceptions may be filed by any party to the suit within one month from the time of the return of said report to the Court.

It is further ordered, that the time in which complainant shall take its evidence in support of its bill is fixed at and limited to ninety (90) days from the date hereof; that the time within which the defendants shall take their evidence in defense herein is fixed at and limited to one hundred twenty (120) days thereafter; that the time within which the complainant shall take its evidence in rebuttal is fixed at and limited — thirty (30) days after the closing of the testimony for the defense and notice thereof in writing.

And it is further ordered, that the Master may appoint subject to the approval of the parties, a stenographer or stenographers, who shall be authorized to take and transcribe under the direction of the

Special Master, the testimony in this case.

ALEXIS C. ANGELL, District Judge.

Dated Detroit, Michigan May 17th, 1912.

Filed May 17th, 1912. ELMER W. VOORHEIS, Clerk.

39

6.

Opinion on Motion for Preliminary Injunction.

In the District Court of the United States for the Eastern District of Michigan, Southern Division. In Equity.

No. 4117.

THE DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Complainant,

VS.

FRANZ C. KUHN, Attorney General of the State of Michigan, et al., Defendant-.

Before Knappen and Denison, Circuit Judges, and Angell, District Judge.

The judges who heard this motion think it probable that the decision of the Supreme Court in the pending so-called, Rate Cases, including Minnesota and Kentucky cases, will be instructive, if not controlling, as to the proper disposition of this motion. The Supreme Court will announce decisions on June 10th next, and it seems to us advisable to delay until after that date any decision upon the questions argued here. Whether our decision should be then further delayed in case the Supreme Court does not dispose of the Rate Cases on June 10th, we then can consider.

The restraining order will for the present be continued until June 28th next. This continuation, and any further continuations, will be upon two conditions: The first condition will be that the Complainant will speed the cause by proceeding with its testimony as

rapidly as may be. The second condition will be that the payment of the receipts which the Railroad Company is now issuing under our previous order for the excess over two cents per mile (and one cent in the case of children), be secured by filing in this cause

a bond in the sum of Two Hundred Thousand Dollars (\$200,-000) so that any holder of these excess certificates may resort through this court to such bond.

Dated Detroit, Mich., May 29th, 1912.

LOYAL E. KNAPPEN,
Circuit Judge.
ARTHUR C. DENISON,
Circuit Judge.
ALEXIS C. ANGELL,
District Judge.

Filed May 29th, 1912. ELMER W. VOORHEIS, Clerk.

41

7.

Order Continuing Preliminary Injunction Conditionally.

At a Session of the District Court of the United States for the Eastern District of Michigan, Continued and Held, Pursuant to Adjournment, at the District Court-room, in the City of Detroit, in said District, on Wednesday, the Twenty-ninth Day of May, in the Year of Our Lord One Thousand Nine Hundred and Twelve.

Present: The Honorable Loyal E. Knappen, Circuit Judge; the Honorable Arthur C. Denison, Circuit Judge; the Honorable Alexis C. Angell, District Judge.

In Equity.

No. 4117.

THE DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Complainant,

VS.

FRANZ C. KUHN, Attorney General of the State of Michigan, et al., Defendants.

The court having by an order entered on September 26th 1911 extended the operation of the restraining order entered herein on July 26th 1911 upon condition, which has since been fulfilled, that the Complainant should issue to each person buying Michigan intrastate passenger transportation, a receipt, certificate or agreement, in form approved by the Attorney General of the State of Michigan, by which it should bind itself to refund any amount paid for such transportation in excess of two cents per mile, and in case of children under twelve years of age any amount in excess of one cent per mile,

if this court should finally decree that the rates, fares and charges provided for in Act 276 of the Public Acts of the State of Michigan for 1911 are valid and enforceable against said Complainant; arguments upon the propriety of issuing an interlocutory injunction having been heard; and a decision not having as yet been handed down by the Supreme Court of the United States in the case mentioned in

said order of September 26th, 1911.

It is by the Court Ordered that the restraining order hereto-42 fore issued and continued as aforesaid, be further continued until June 28th next upon the following conditions, viz: First, that the taking of testimony by the Complainant in said cause proceed with all reasonable speed; and Second, that, in addition to the issuance of the receipts, certificates or agreements to passengers, within twenty days from this day the Complainant file a bond in the full sum of Two Hundred Thousand Dollars (\$200,000) with sufficient surety or sureties, to be approved by the Clerk of this court, and to run to the said Clerk for the benefit of the holders of such receipts, certificates or agreements, and conditioned that within such time and under such conditions as the court may hereafter order, the Complainant shall pay into court the full amount of such receipts, certificates or agreements as may be filed or presented in this court under the provisions of any order hereafter, entered herein.

LOYAL E. KNAPPEN,
Circuit Judge.
ARTHUR C. DENISON,
Circuit Judge.
ALEXIS C. ANGELL,
District Judge.

Filed May 29th, 1912.

ELMER W. VOORHEIS, Clerk.

43 8.

(Indorsement:) U. S. District Court, Eastern District of Mich., Southern Division, In Equity. Duluth, South Shore & Atlantic Ry. Co., Complainant, vs. Franz C. Kuhn, et al., Defts. Bond of Complainant in pursuance of Order of Court, dated May 29, 1912. Filed June 13th, 1912, at — o'clock — M. (Signed) Elmer W. Voorheis, Clerk.

44 District Court of the United States for the Eastern District of Michigan, Southern Division. In Equity.

No. 4117.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Complainant,

VS.

FRANZ C. KUHN, Attorney General of the State of Michigan, et al., Defendants.

Know all men by these presents, That we, The Duluth, South Shore & Atlantic Railway Company, a corporation organized under the general railroad laws of Michigan, as principal, and Maryland Casualty Company, a corporation organized under the laws of Maryland, as surety, are held and firmly bound unto Elmer W. Voorheis, Clerk of the U. S. District Court for the Eastern District of Michigan, Southern Division, in the sum of Two Hundred Thousand Dollars (\$200,000), lawful money of the United States, to be paid to the said Elmer W. Voorheis, or to his lawful successor in office, for the use and benefit of the holders of all receipts, certificates or agreements, hereinafter more particularly described; for which payment, well and truly to be made, we bind ourselves, our and each of our successor; jointly and severally, firmly by these presents.

Sealed with our seals, dated the sixth day of June, one thousand,

nine hundred and twelve.

45

Whereas, the above bounden Duluth, South Shore & Atlantic Railway Company, on July 26, 1911, commenced a suit in Equity, in the Circuit Court (now District Court) of the United States for the Eastern District of Michigan, Southern Division, against the above named

defendants, to enjoin the enforcement of Act No. 276 of the Public Acts of 1911 of the Legislature of Michigan, approved

May 2, 1911, as against said complainant; and,

Whereas, on July 26, 1911, the said Court entered an order restraining, until the further order of the Court, the said defendants from enforcing, or attempting to enforce in any manner, the provisions of said Act against said complainant, reference to which said restraining order, now on file in said Court, is hereby made for greater particularity; and.

Whereas, the said Court, by an order entered in the above entitled cause on September 26, 1911, extended the operation of said restraining order until January 16, 1912, upon condition, which has since been fulfilled, that the complainant therein should issue to each person buying Michigan intrastate passenger transportation a receipt, certificate or agreement in form approved by the Attorney General of the State of Michigan, by which it should bind itself to refund any amount so paid for such transportation in excess of two cents per mile, and in case of children under twelve years of age any amount in excess of one cent per mile, if the said Court should finally

decree that the rates, fares and charges provided for in said Act 276 are valid and enforceable against said complainant; and,

Whereas, on January 16, 1912, the said Court entered a further order continuing the said restraining order until May 29, 1912; and,

Whereas, on May 29, 1912, the said Court entered a further order continuing the said restraining order until June 28, 1912, upon certain conditions therein set forth, including the filing of this bond:

Now, therefore, the condition of this obligation is such, That if the above bounden Duluth, South Shore & Atlantic Railway Company shall, within such time and under such conditions as the sail

Court may hereafter order, pay into Court the full amount
due upon all such receipts, certificates or agreements hereinbefore described, as may be filed or presented in said Court
under the provisions of any order hereafter entered in said cause, then
this obligation to be void, else to remain in full force and virtue.

[SEAL.] DÚLUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY,

(Signed) By A. B. ELDREDGE, President. (Signed) JAS, CLARKE, Secretary.

[SEAL.] MARYLAND CASUALTY COMPANY, (Signed) By PETER WHITE PHELPS,

Its Attorney in Fact.

Signed, Sealed and Delivered in presence of:

(Signed) ALBERT E. MILLER,

(Signed) M. E. LEHNEN,

As to A. B. E.

(Signed) IVINS A. BROWNE, (Signed) JOSEPH ZEPPO,

As to J. C.

(Signed) ALBERT E. MILLER,

(Signed) M. E. LEHNEN,

As to P. W. P.

Detroit, Mich., June 13, 1912.

I hereby approve the within bond as to sufficiency and amount.

(Signed)

ELMER W. VOORHEIS,

Clerk U. S. District Court,

Eastern District Mich.

47 No. 293.

Power of Attorney from Maryland Casualty Company to ----

Know all men by these presents: that Maryland Casualty Company, a corporation created by and existing under the Laws of the State of Maryland, of the City of Baltimore, Maryland, and duly authorized to act as sole surety in the State of Michigan, has made, con-

stituted, and appointed and by these presents doth make, constitute and appoint Peter White Phelps or Harlow A. Clark its true and lawful attorney for and on behalf of the said corporation as surety, to make, sign and acknowledge a Bond in the penalty of two hundred thousand (\$200,000,00) dollars to be executed by Duluth South Shore & Atlantic Railway Company, as Principal, conditioned for payment by said Railway Company to Clerk of U. S. District Court, Eastern District of Michigan, within such time and under such conditions as the Court may hereafter order (in the case now pending in said Court of said Railway Company vs. Franz C. Kuhn, Attorney General of the State of Michigan, and others) the full amount due upon all such receipts, certificates or agreements issued by said Railway Company pursuant to the order of said Court in said cause, dated Sept. 26, 1911, as may be filed or prescribed in said Court under the provisions of any order hereafter entered therein, hereby approving, ratifying and confirming all that its said attorney may do or lawfully cause to be done in the premises by virtue of these presents.

In witness whereof Maryland Casualty Company has caused these presents to be signed by ———— Vice President of said Company and its corporate seal to be hereunto affixed this the sixth day

of June 1912.

(Signed) MARYLAND CASUALTY COMPANY, (Signed) By JAS. W. STONE, Vice-President.

Attest:

[SEAL.] (Signed) JAS. F. MITCHELL, Secretary.

O. K.

L. C. R.

Extract from the By-Laws.

Article IV, Section V. The President, or any of the Vice-Presidents, shall have power by and with the concurrence of the Secretary or any one of the Assistant Secretaries, to appoint any attorney in fact or to authorize any person or persons to execute on behalf of the Company, any bonds, recognizances, stipulations, undertakings, deeds, releases of mortgages, contracts, agreements and policies, and to affix the seal of the Company thereto.

I, James F. Mitchell, Secretary of the Maryland Casualty Company, do hereby certify that the above and foregoing is a full, true and correct copy of Article IV, Section V, of the by-laws of the Maryland Casualty Company, as the same appears on the records of the Company now in my possession and custody.

In witness whereof, I have hereunto set my hand and affixed the seal of said Company at the City of Baltimore, this sixth day of June,

A. D. 1912.

(Signed) JAS. F. MITCHELL, Secretary.

Filed June 13th, 1912. ELMER W. VOORHEIS, Clerk. 48

9.

Order Continuing Restraining Order.

The District Court of the United States for the Eastern District of Michigan, Southern Division. In Equity.

Former C. C. No. 4117.

THE DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY.
Complainant,

VS.

GRANT FELLOWS, Attorney General of the State of Michigan, et al., Defendants.

This Court having heretofore continued the restraining order entered in said cause on July 28, 1911 until the 1st day of February, 1913:

Pursuant to the stipulation of counsel, and with the approval of the Circuit Judges who participated in the hearing of the applica-

tion for interlocutory injunction;

It is now further ordered that the restraining order heretofore entered and continued here, be and the same is hereby continued in force until the hearing of said cause upon the motion for a preliminary injunction heretofore made herein, which said motion may be set down for hearing by either party to the said cause upon two weeks notice to the opposite party, unless the said court shall sooner vacate the said restraining order.

Approved for entry.

LOYAL E. KNAPPEN,
Circuit Judge.
ARTHUR C. DENISON,
Circuit Judge.
ARTHUR J. TUTTLE,
Circuit Judge.

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10.

Præcipe for Appearance.

United States Circuit Court, Eastern District of Michigan, Southern Division. In Equity.

No. 4117.

THE DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Complainant,

VS.

Grant Fellows, Cassius L. Glasgow, C. S. Cunningham, Lawton T. Hemans, et al., Defendants.

Now come Grant Fellows, Attorney General of the State of Michigan, and Roger I. Wykes, of Counsel, and enter appearance in the

above entitled cause for the class of passengers within the State of Michigan similar to those named in paragraph II of the Bill filed herein, the individuals of which class are unknown to complainant, and for each and every person constituting or belonging to that class, except the defendants, John R. Van Evera, Morgan W. Joplin and Fred S. Case, and claim the benefit for such class and for each member thereof, except those named, of the answer, proceedings, and testimony which have been heretofore filed, taken or introduced on behalf of the state officers who are named as defendants in said proceedings fully and to the same extent as though such class and the representatives thereof had joined in such answer and proceedings, and had participated directly in the taking of proofs and in the defense in this cause.

GRANT FELLOWS, Attorney General. ROGER I. WYKES, Of Counsel.

Filed Dec. 10, 1914. ELMER W. VOORHEIS, Clerk.

50

11.

Motion for Order Permitting Appearance.

United States District Court, Eastern District of Michigan, Southern Division. In Equity.

No. 4117.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Complainant,

VS.

Grant Fellows, Cassius L. Glasgow, Lawton T. Hemans, C. S. Cunningham, et al., Defendants.

Now come Grant Fellows, Attorney General of the State of Michigan and Roger I. Wykes of Counsel, representing the unnamed and unknown persons who may become or desire to become passengers upon the complainant's railroad, and move the court for and order nune pro tune as of the date of the appearance of the several state officers herein, permitting the above named solicitors to appear for such class, and the individuals constituting the same (except John R. Van Evera, Morgan W. Joplin and Fred S. Case) and permitting such a class, (except the persons named) to stand upon and have full advantage of the answer, proceedings and testimony of, and taken on behalf of, the several state officers named as defendants herein, and who have appeared, answered, and participated in the defense hereof.

This motion is based upon the record and proceedings in said cause which indicate: that no appearance for such class has hereto-

fore been entered, and such class has not been defaulted nor have any individual members thereof, except John R. Van Evera, Morgan W. Joplin and Fred S. Case; that no change in the pleadings or proofs will be required or made necessary by accepting and permitting such appearances, and that the proceedings in such cause do not show that the defendants who have appeared or their silicitors have had any notice of the attempted default of the above named defendants, John R. Van Evera, Morgan W. Joplin or Fred S. Case.

On behalf of the defendants who have appeared herein, and the said Attorney General, and his counsel, it is hereby stated that no notice of the default of the last named persons or of their failure to appear in said cause, was ever served upon the state officers who are defendants herein, or upon their solicitors or any of them.

GRANT FELLOWS, Attorney General. ROGER I. WYKES, Of Counsel.

Filed December 10th, 1914. ELMER W. VOORHEIS, Clerk.

52 12.

Stipulation Regarding Corporate and Land Grant History.

In the District Court of the United States for the Eastern District of Michigan, Southern Division. In Equity.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Complainant,

VS.

GRANT FELLOWS et al., Defendants.

Subject to the objection of the complainant that the facts are irrelevant and immaterial, it is stipulated, by and between the above

named parties, by their respective solicitors, as follows:

1. The Iron Mountain Railroad Company was a steam railroad incorporated in 1855 for a term of 100 years. Capital stock authorized \$400,000. Surveyed in 1852 and completed in 1857. It ran from Marquette to Lake Superior Mine (Ishpeming) and other mines.

2. The Iron Mountain Railway Co., was a strap railroad incorporated in 1855. Capital stock authorized \$140,000. Opened Nov. 1, 1855. Its projected termini were from Marquette to the Mines of Jackson Iron Mountain (14 miles). It was operated for 2 years and in 1857 consolidated with the Iron Mountain Railroad. Its corporate term expired March 10, 1885. The Iron Mountain Railroad and the Iron Mountain Railway were, after consolidation in 1857, sold in 1859 to Bay de Noquet and Marquette Railroad Co., which sale was confirmed by the act of February 15, 1859.

3. The May De Noquet and Marquette Railroad Co., was incorporated in 1856 under the act of February 12, 1855. Its corportae term was for 100 years and its capital stock authorized \$1,500,000.

It received a land grant from the State of Michigan under the Act of Congress of June 3, 1856, and the Michigan Act of 53 February 14, 1857, the land grant being accepted by it March 25, 1857. The construction was approved by the Governor in 1862. the acreage of the original grant was 318,123,28, and of this 128,301.05 was patented by the state to the Marquette, Houghton and Ontonagon Railroad Co., the successor of the Bay de Noquet and Marquette Railroad Co., on account of the construction of the latter, Marquette to Ishpeming. The projected termini of the Bay de Noquet & Marquette Railroad were Marquette and Little Bay de Noquet. The road was completed from Marquette to Ishpeming (20 miles) on December 1, 1862. The Bay de Noquet & Marquette was, in 1871, consolidated under the Michigan General Railroad Law with the Marquette and Ontonagon Railroad Co, retaining the name of the latter. The contract of consolidation providing that the new corporation "shall be subject to all the restrictions and liable for all the contracts and indebtedness and perform all the duties imposed by law upon either or both the said corporations."

4. The Marquette and Ontonagon Railway Co., was incorporated in 1857 for a term of 500 years. Capital stock authorized \$1,000,000. The projected termini were Marquette and Ontonagon (100 miles). This road accepted a land grant from the state of Michigan under the act of Congress of June 3, 1856, and the Michigan Act of February 14, 1857. There was no construction and the land grant was

forfeited by the act of the Legislature of March 17, 1863.

5. The Marquette and Ontonagon Railroad Co., was incorporated in 1863 for a term of 99 years. Capital stock authorized \$2,000,000. The projected termini were Marquette and Ontonagon, via L'Anse (125 miles) 20 miles of the road was constructed by November 17, 1865, from Ishpeming to Lake Michigamme (Champion). An amendment to the articles of association was filed in 1872, making the western terminus the westerly line of Section 9, T. 47, N., 30 W. (length 42 miles). By the Legislative act of March 17, 1863, the forfeited land grant of the Marquette & Ontonagon Railway Co., was conferred upon the Marquette & Ontonagon Railroad Co.

This grant was later forfeited by the joint resolution of the Michigan Legislature of March 30, 1869, and the resolution gave the Michigan Board of Control of state swamp lands the power to confer the grant upon some other company. This Board of Control conferred the grant upon the Houghton and Ontonagon Kailroad Company and this action was confirmed by the joint resolution of January 24, 1871.

There was patented to the Marquette, Houghton & Ontonagon Railroad Co., 153,690.27 acres on account of the Marquette & Ontonagon Railroad construction from Ishpeming to Champion.

6. The Houghton and Ontonagon Railroad Co., was incorporated in 1870 for a term of 999 years. Original capital stock \$560,000; increased in 1872 to \$1,200,000. The projected termini were a

point east of Lake Michigamme and Ontonagon. In 1872 the termini were changed to Marquette and Ontonagon and were again changed to Champion and Ontonagon. No construction. This company took the Marquette & Ontonagon Railroad forfeited grant as above set forth. By virtue of a contract entered into on September 1, 1871, with Peter Mitchell, Swamp Land State Road Commissioner for the Upper Peninsula, this company became entitled to the sum of \$40,000, payable in state swamp lands. Under this contract, land to the amount of 32,000 acres was granted to various persons on order of the Marquette, Houghton and Ontonagon Railroad Company, which succeeded to the rights of the Houghton and Ontonagon Railroad Co.

7. The Houghton and L'Anse Railroad Co. was incorporated in 1881 for a term of 1000 years. Capital stock authorized \$1,000,000. The projected termini were Houghton and L'Anse (32 miles). This company received from the state a grant of state swamp lands under the act of May 1, 1875. The grant passed and was patented to the Marquette, Houghton & Ontonagon Railroad Co., upon the consolidation of the Houghton and L'Anse Railroad, with the Mar-

quette, Houghton & Ontonagon Railroad.

8. The Marquette, Houghton and Ontonagon Railroad Co., 55 this corporation was formed in 1872 for a term of 999 years by consolidation of the Marquette and Ontonagon Railroad with the Houghton and Ontonagon Railroad under the Michigan General Original capital stock \$2,040,000, increased in 1874 Railroad Law. The projected termini were Marquette and Ontonato \$5,000,000. The Governor on February 6, 1873, certified that the road between the completed portions of the Marquette and Ontonagon Railroad (Champion) and L'Anse (32 miles, plus 1390 ft.) was completed before December 31, 1872. In 1883, the Marquette, Houghton & Ontonagon Railroad was consolidated with the Houghton and L'Anse Railroad under the Michigan General Railroad Law under the name of the former. The road was opened from L'Anse to Houghton in 1883 (32.14 miles). The total mileage in 1872 was 84.34 miles; in 1887 it was 135.42 miles, as shown by reports.

The land grants patented to the Marquette, Houghton and On-

tonagon Railroad were the following:

(A) Federal acts:

(A) rederal acts:		
	128,301.05	acres
(2) The grant to the Marquette and Ontonagon Railroad on account of construction from Ishpeming to Champion	153,690.27	44
(3) The grant to the Marquette, Houghton and Ontonagon Railroad Co., on account of construction from Champion to L'Anse	180,389.42	66
Total lands patented by state to Marquette, Houghton and Ontonagon Railroad on account of Federal Acts	462,380.74	"
Less amount necessarily included in the deed of release to the State, executed on April 8, 1874	28,150.10	"
Net total lands received by Marquette, Houghton and Ontonagon Railroad Company, on account of Federal Acts		44
56 (B) Under State swamp land contracts:		
 On account of the grant to the Houghton and L'Anse Railroad Co., for the construction from L'Anse to Houghton On account of grant to Houghton and Ontonagon Railroad Co., for construction 	82,421.62	acres
from L'Anse to Nestoria, (patented to various people on order of Marquette, Houghton and Ontonagon Railroad Co.)		"
Total acres swamp land used or received by Marquette, Houghton and Ontona- gon Railroad Co		44

Of the public lands patented to the Marquette, Houghton and Ontonagon Railroad Co., there passed to the Duluth, South Shore & Atlantic Railway Company 82,385.29 acres (being the lands conveyed by that company to the South Shore Land Company, Limited). All the other granted lands of the Marquette, Houghton and Ontonagon Railroad Co. having been disposed of by the last named Company; of which lands so previously disposed of, about 386,000 acres were sold for a consideration of \$2,400,000 during the year 1881.

9. The Marquette and Western Railroad Co. was incorporated in 1883, to compete with the Marquette, Houghton and Ontonagon Railroad. Capital stock authorized \$1,250,000. Its termini were Marquette and Ishpeming (17.03 miles). Was purchased in 1885,

by the Marquette, Houghton and Ontonagon Railroad for the sum

of \$2,011,346.93, stocks and bonds being given in payment.

10. The Detroit, Mackinac and Marquette Railroad Co. was incorporated in 1879 for a term of 1000 years. Original capital stock authorized \$1,200,000; amount paid in, in 1880, \$5,360. The capital stock was increased in 1881, in 1882 and 1883 to a total of \$10,-The projected termini were Mackinac to Marquette (152 The road was reported complete on December 15, 1881. miles). This company received a state swamp land grant by the provision of Chapter 36 of the Public Acts of 1873, and subsequent acts extending the time for construction. The grant as made was 1,326,-688.35 acres and the lands were patented in March and April 1882.

The Detroit, Mackinac and Marquette Railroad was sold under foreclosure on October 20, 1886, and was purchased for

57 \$1,010,000 by Hugh McMillan, whose deed was filed December 20, 1886. The patented lands of this company were separately mortgaged and passed to the mortgagees or their grantees. None of this land came ir to possession of the Duluth, South Shore & Atlantic Railway Company.

11. The Saul Ste. Marie & Marquette Railroad Co. was incorporated in 1880 for a term of 99 years. Capital stock authorized \$300.-Its projected termini were from a point on the Detroit, Mackinac and Marquette Railroad to Sault Ste. Marie (35 miles) all in

There was no construction. Chippewa County.

12. Mackinac and Marquette Railroad Co. was incorporated in 1886 for a term of 999 years. Capital stock authorized \$3,040,000. This company was organized by the *purchaser* at the foreclosure sale of the Detroit, Mackinac & Marquette Railroad pursuant to the provisions of Section 6224 of the Compiled Laws of 1897.

13. Duluth, Superior and Michigan Railway Co., was a Wisconsin corporation, incorporated in 1886. Capital stock authorized \$6,500,-Its projected termini were from West Superior to Montreal

River, Township 47, Range 1 East. No construction.

14. The Wisconsin Sault Ste. Marie & Mackinac Railway Co. was incorporated in 1886 for a term of 99 years. Capital stock authorized \$2,600,000. The proposed termini were the Montreal River, the dividing line between Michigan and Wisconsin, and Marquette,

No construction.

15. Duluth, South Shore & Atlantic Railway Co., was incorporated in 1887 under the Michigan General Railroad Law by the consolidation of the railroad companies described above in paragraphs 11, 12, 13 and 14 for a term of 99 years. Its capital stock is \$22,-000,000; \$10,000,000 of preferred stock and \$12,000,000 of common By the law authorizing the consolidation the new company was required to become and "be subject to all the obligations and liabilities heretofore resting upon said several corporations so

consolidated.

58 The Marquette, Houghton and Ontonagon Railroad was leased to the Duluth, South Shore & Atlantic Railway Co., in 1887, on the latter guaranteeing 6% on \$3,278,456, now preferred stock and surplus net earnings to holders of common stock. This lease was repudiated by the Duluth, South Shore & Atlantic Railway Co., stockholders and cancelled by both companies. On July 17, 1890, the Duluth, South Shore & Atlantic Railway Co., purchased all the property of the Marquette, Houghton and Ontonagon Railroad Co., except its franchise to be a corporation; the latter company having previously disposed of the larger portion of its lands, as hereinbefore set forth in paragraph 8 hereof; the Duluth, South Shore & Atlantic Railway Co., acquired and holds the entire capital stock of the Marquette, Houghton and Ontonagon Railroad Co., with the exception of a few hundred shares of stock which are still outstanding in the hands of the public.

16. The Dead River Railroad was constructed in 1889 and ran from a point on the Duluth, South Shore & Atlantic Railway near the west limits of the city of Marquette, about 3 miles northeasterly to reach the mill and yards of the Dead River Lumber Company. All the property of this company was purchased by the Duluth, South

Shore & Atlantic Railway Co. in July 1907.

The following corporations are connected with the Duluth, South Shore & Atlantic Railway Co., through stock ownership or otherwise.

17. The South Shore Land Company Limited was organized in 1898 under the Michigan partnership association statute for the purpose of taking over and managing the lands received from the Marquette, Houghton and Ontonagon Railroad Co. Capital stock \$3,000, all of which is owned by the Duluth, South Shore & Atlantic Railway Co. To this company was conveyed 82,385.29 acres of swamp land granted on account of the Marquette, Houghton and

Ontonagon Railroad construction from Houghton to L'Anse.

Up to the time of the commencement of this suit 10,991.82
acres of said land had been sold by said company and it then

held about 71,393.47 acres unsold.

18. The Mineral Range Railroad Co., was incorporated in 1871, under the name of the Mineral Range and L'Anso Bay Railroad Co. Its capital stock was \$200,000 and on November 8, 1872, its stock was increased to \$400,000 and its name changed to the Mineral Range Railroad Company. The stock was increased in 1901, 1903 and 1910 until it is now authorized at \$1,500,000. Its projected termini were from Keweenaw Bay, via Houghton, to Calumet (45 miles). The proposed length was increased to 100 miles on November 18, 1872. The total mileage is 73.21. This company is controlled by the Duluth, South Shore & Atlantic Railway Co., through the ownership by the Duluth, South Shore & Atlantic Railway Co. of 53% of the capital stock of the Mineral Range Railroad Co.

19. The Hancock and Calumet Railroad Co. was incorporated in 1885, for a term of 50 years. Its projected length was 18 miles, from Portage Lake, via Lake Linden, to Red Jacket. In 1886, its length was increased 4 miles and capital stock increased to \$350,000, and in 1899, the proposed length was increased to 50 miles. The total mileage is 33.14 miles. This road is controlled by the Mineral Range Railroad Co., by its ownership of the entire capital stock of the former. The road is leased by the Mineral Range Railroad Co.,

for the corporate existence of the Hancock and Calumet Railroad

Co.

20. The Mohawk Mining Company Railroad. This railroad has a mileage of 16.7 miles and is owned by the Mohawk Mining Company. It is operated and maintained by the Mineral Range Railroad Company by a contract which expires on Decem'er 15, 1917, and calls for an annual rental, paid by the Mineral Range Railroad Co., to the Mohawk Mining Company of \$2,700.

21. Canadian Pacific Railway Company. This company in July 1888 purchased majority holdings of the common and pre-

60 ferred stock of the Duluth, South Shore & Atlantic Railway
Co. At present the Canadian Pacific Railway Co. holds
\$6,100,000 in common stock; \$5,100,000 in preferred stock, the
entire issue of the first consolidated mortgage bonds and the entire
issue of the income bonds of the Duluth, South Shore & Atlantic
Railway Co.

All of the incorporations above referred to, with the exception of that of the Canadian Pacific Railway Co., were under the general

laws of the state of Michigan.

Dated this 7th day of December, 1914.

A. B. ELDREDGE, Solicitor for Complainant. ROGER I. WYKES, Of Counsel for Defendants.

Filed December 10, 1914, ELMER W. VOORHEIS, Clerk.

61 13.

(Indorsement:) United States District Court, Eastern District of Michigan, Southern Division. Duluth, South Shore & Atlantic R. R. Co., vs. Grant Fellows, Attorney General, et al. Memorandum Order in re deposit in Clerk's Office of Bank receipts of 1/3 of Plaintiff's gross earnings. Filed Oct. 25, 1915, at — o'clock — M. (Signed) Elmer W. Voorheis, Clerk. (Not to be entered. E. W. V.)

62 United States District Court, Eastern District of Michigan, Southern Division. In Equity.

At Chambers in the City of Grand Rapids, on the 22nd day of October, 1915, there being present: Circuit Judges Loyal É. Knappen and Arthur C. Denison, and District Judge Clarence W. Sessions.

Former C. C. No. 4117.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Complainant,

V.

GRANT FELLOWS, CASSIUS L. GLASGOW, LAWTON T. HEMANS, C. S. CUNNINGHAM, et al., Defendants.

In the above entitled cause it having been made to appear to the Court that the bond for \$200,000, filed by the complainant pursuant to the order of this Court, is no longer sufficient in amount to secure the liability of the complainant in this suit if a decree adverse to it shall be rendered.

It appearing, further, that on September 30, 1915, the total amount of the receipts, certificates or agreements issued by the complainant pursuant to the order of the Court entered herein on September 26, 1911 (which receipts, certificates or agreements are hereinafter called "refund checks"), was approximately \$502,192.00, and not in excess of that amount.

It appearing, further, that the complainant had, on September 30, 1915, created a fund amounting to \$188,546.63, which it has set aside for the purpose of redeeming said refund checks in case it shall be compelled to make such redemption, which fund is deposited as follows:

63

In the Marquette County Savings Bank, Marquette,	
Mich.	\$103,091.16
In the Negaunee National Bank, Negaunee, Mich	36,649.28
In the Negaunee National Bank, Negaunee, Mich	36,649,28

It appearing, further, that the said complainant is willing to submit said fund to the order of the Court, to be used for the redemption of said refund checks in case the complainant shall become liable to make such redemption; and,

It further appearing that said complainant is willing hereafter to deposit in such redemption fund one-third of its gross revenues received during each month hereafter for the transportation of passengers within the State of Michigan, until such time as the amount of the fund, including the amount of the bond heretofore given, shall equal the gross liability of the complainant for refund checks theretofore issued, and is willing thereafter to deposit monthly the amount of its current liability by reason of the issuing of refund checks.

Now, therefore, it is ordered, That

If and when, within twenty days from the date of this order, the complainant shall subject the fund already accumulated to the order of this Court, to secure the payment of such refund checks as the complainant shall be adjudged liable to pay, by filing with the Clerk of this Court a receipt from each bank hereinbefore named, acknowledging that it holds, and will hold, that portion of said fund already on deposit with it, and all additions thereto, including interest accruing thereon, subject to the order of this Court in this case;

And if the complainant shall make further deposits monthly equaling one-third of its gross revenues received for the transportation of passengers in Michigan, as such earnings are determined in

the usual course of its business, until the total on deposit
64 to secure the redemption of refund checks shall equal the
gross accrued possible liability of the complainant on that
account, less \$200,000.00, and thereafter shall deposit each month
an amount equal to its accruing liability by reason of the issuing
of refund checks in that month, less any interest accrued and pay-

able on deposits previously made;

And if the complainant shall hereafter make monthly reports to the Clerk of this Court on or before the 27th day of each month, certifying that it has complied with this order, and showing the amounts deposited in pursuance hereof during the preceding calendar month, and the several depositories thereof, which depositories shall be the banks hereinbefore named, or such other bank or banks selected by complainant as shall have agreed, in the manner and form hereinbefore described, to hold the sums deposited with it or them subject to the order of this Court; then the restraining order heretofore issued in this case shall be and continue in force until the further order of the Court.

Such funds when so deposited, including all additions thereto, shall be held, pursuant to this order, and be subject to be withdrawn only upon the proper order of this Court, and shall be charged with a trust in favor of such holders of refund checks, as shall, upon the termination of this litigation, be determined by the court to be en-

titled to participation therein.

It is further made a condition of this order that complainant shall make such further or other reports showing its proceedings under this order as may be required by the Court, or by the Clerk thereof, and that it shall serve on the solicitor for the defendants copies of all statements or reports that it shall make to the Court or its Clerk.

 $\begin{array}{cccc} \text{(Signed)} & \text{L. E. KNAPPEN,} \\ \text{(Signed)} & \text{A. C. DENISON,} \\ & & & & Circuit Judges.} \\ \text{(Signed)} & \text{C. W. SESSIONS,} \\ & & & & District Judge.} \end{array}$

The undersigned Bank hereby acknowledges that there has been deposited with it by The Duluth, South Shore & Atlantic Railway Company a special fund known as the "Michigan Rate Case Fund," amounting at this date to the sum of \$_____; that it will hold such deposit, and all additions thereto, together with all interest accruing, in strict accordance with the terms of an order of the United States District Court for the Eastern District of Michigan

gan, Southern Division, in Equity, of which the foregoing is a copy; that it will pay the same out only when and as authorized by proper order of the said Court; and that it will make reports of the amounts on deposit in such fund whenever required to do so by said Court or the Clerk thereof.

Dated ----

Filed Octo' er 25, 1915. ELMER W. VOORHEIS, Clerk.

66 14.

Order Regarding Fund to Secure Payment of Refund Coupons.

United States District Court, Eastern District of Michigan, Southern Division. In Equity.

At Chambers in the City of Grand Rapids on the 22nd day of October 1915, there being present: Circuit Judges Loyal P. Knappen and Arthur C. Denison, and District Judge Clarence W. Sessions.

Former C. C. No. 4117.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Complainant,

v.

Grant Fellows, Cassius S. Glasgow, Lawton T. Hemans, C. S. Cunningham, et al., Defendants.

In the above entitled cause it having been made to appear to the Court that the bond for \$200,000 filed by the complainant pursuant to the order of this Court, is no longer sufficient in amount to secure the liability of the complainant in this suit if a decree adverse to it shall be rendered.

It appearing, further, that on September 30, 1915, the total amount of the receipts, certificates or agreements issued by the complainant pursuant to the order of the Court entered herein on September 26, 1911 (which receipts certificates or agreements are hereinafter called "refund checks") was approximately \$503,192.00, and not in excess of that amount.

It appearing, further, that the complainant had, on September 30, 1915, created a fund amounting to \$188,546.63, which it has set aside for the purpose of redeeming said refund checks in case it shall be compelled to make such redemption, which fund is deposited as follows:

 It appearing further that the said complainant is willing to submit said fund to the order of the Court, to be used for the redemption of said refund checks in case the complainant shall become liable to

make such redemption; and,

It further appearing that said complainant is willing hereafter to deposit in such redemption fund one-third of its gross revenues received during such month hereafter for the transportation of passengers within the State of Michigan, until such time as the amount of the fund, including the amount of the bond heretofore given, shall equal the gross liability of the complainant for refund checks theretofore issued, and is heretofore to deposit monthly the amount of its current liability by reason of the issuing of refund checks.

Now, therefore, it is ordered, That

If and when, within twenty days from the date of this order, the complainant shall subject the fund already accumulated to the order of this Court, to secure the payment of such refund checks as the complainant shall be adjudged liable to pay, by filing with the Clerk of this Court a receipt from each bank hereinbefore named, acknowledging that it holds, and will hold, that portion of said fund already on deposit with it, and all additions thereto, including interest accruing

thereon, subject to the order of this Court in this case;

And if the complainant shall make further deposits monthly equaling one-third of its gross revenues received for the transportation of passengers in Michigan, as such earnings are determined in the usual course of its business, until the total on deposit to secure the redemption of refund checks shall equal the gross accrued possible liability of the complainant on that account, less \$200,000.00, and thereafter shall deposit each month an amount equal to its accruing liability by reason of the issuing of refund checks in that month, less any interest accrued and payable on deposits previously made;

And if the complainant shall hereafter make monthly reports to the Clerk of this Court on or before the 27th day of each month, certifying that it has complied with this order, and showing the amounts

deposited in pursuance hereof during the preceeding calendar month, and the depositories thereof, which depositories shall

be the banks hereinbefore named, or such other bank or banks selected by complainant as shall have agreed, in the manner and form hereinbefore described, to hold the sums deposited with it or them subject to the order of this Court; then the restraining order heretofore issued in this case shall be and continue in force until the further order of the Court.

Such funds when so deposited, including all additions thereto, shall be held, pursuant to this order, and be subject to be withdrawn only upon the proper order of this Court, and shall be charged with a trust in favor of such holders of refund checks, as shall, upon the termination of this litigation, be determined by the court to be entitled to participate therein.

It is further made a condition of this order that complainant shall make such further or other reports showing its proceedings under this order as may be required by the Court, or by the Clerk thereof,

and that it shall serve on the solicitor for the defendants copies of ail statements or reports that it shall make to the Court or its Clerk.

L. E. KNAPPEN, A. C. DENISON, Circuit Judges. C. W. SESSIONS. District Judge.

The undersigned Bank hereby acknowledges that there has 69 been deposited with it by The Duluth, South Shore and Atlantic Railway Company a special fund known as the "Michigan Rate Case Fund," amounting at this date to the sum of \$43,217.75, that it will hold such deposit and all additions thereto, together with all interest accruing, in strict accordance with the terms of and order of the United States District Court for the Eastern District of Michigan. Southern Division, In Equity, of which the foregoing is a copy; that it will pay the sum out only when and as authorized by proper order of the said Court; and that it will make reports of the amounts on deposit in such fund whenever required to do so by said Court or the Clerk thereof.

Date- Negaunee, Michigan Oct. 26, 1915.

NEGAUNEE NATIONAL BANK. W. C. WAGNER, Cas.

Filed October 29, 1915. ELMER W. VOORHEIS, Clerk.

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15.

Stipulation as to Certain Exhibits.

In the District Court of the United States, Eastern District of Michigan, Southern Division. In Equity.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Complainant.

VS.

GRANT FELLOWS, CASSIUS L. GLASGOW, LAWTON T. HEMANS, C. S. CUNNINGHAM et al., Defendants.

It is hereby stipulated between the parties that, inasmuch as the originals can not be found, duplicates of the following exhibits may be marked by the Master and returned to the Court:

Complainant's:

No. 1c, Riggs' Allocation of Lands, 1913, as amended. No. 49, Riggs' Apportionment of Values by Departments. No. 50, Riggs' Modification of Exhibit No. 1, Appraisal 1911.

No. 94, I. C. C. Classification for Operating Expenses.

Defendants':

No. 43, and 43a to 43h inclusive, Printed Reports of South Shore for the years 1905 to 1913 inclusive.

No. 44, D. S. S. & A. Switching Tariff. No. 45, C. P. R. Freight Division Sheet.

No. 83, Three Blueprints showing D. S. S. & A. rail sections, and showing wear on upper and lower sides on curves.

It is further stipulated and agreed, that the following ex-71 hibits need not be returned to the Court, but that the Court may call for, and that either party may produce or use, or refer to. any or all of them if and as desired, but that if either party shall produce or use, or refer to, any of said exhibits, said party shall produce the whole thereof for use by the other party if desired.

Complainant's:

No. 11, Riggs' Memorandum of Cooley Appraisal of 1900.

No. 90, Horton, Tax Commission Field Notes, Harlow Additions 1. 2 and 3, Marquette. No. 91, Horton, Tax Commission Field Notes, Harlow Addition

5. Marquette.

No. 92, Horton, Tax Commission Field Notes, Nester Addition 1, Marquette.

Defendants':

1, Report to State Board of Assessors, 1910.

No.

 Vitali's Map of Ontonagon Valley.
 Robertson, Report of Council Committee, Marquette. No.

9, Delf's Ore Tariffs, 1909-1913. No.

No. 23, Volume 5 of 1900 State Appraisals, pp. 64 to 99.

No. 41, Adam's large Land Grant Map.

No. 63, Printed Report of Mackinaw & Marquette R. R. Co., in Railroad Com. Report for 1887, pp. 77 to 88.

No. 66, Proceedings of 3rd Annual Convention of Railroad Commissioners, 1891.

No. 67, Proceedings of 4th Annual Convention of Railroad Commissioners, 1892.

No. 68, Proceedings of 5th Annual Convention of Railroad Commissioners, 1893.

No. 69, 28th Report of Association of American Railway Accounting Officers, 1913.

The following are exhibits of which the Record contains 72 either a full copy, or a sufficiently full copy of the parts pertaining to this controversy, so that the originals need not be returned by the Master:

Complainant's:

- No. 45a, sheet 2, Hire of Equipment, etc., 1910 (R. 3251).
- No. 47a, sheet 2, Hire of Equipment, etc., 1911 (R. 3251).
- No. 48a, sheet 2, Hire of Equipment, etc., 1912 (R. 3251).
- No. 51. Diagram for earthwork estimates, Loweth (R. 2731).
- No. 52, Estimated Loss (R. 3232).
- No. 53, Population and Railroad Mileage (R. 3264).
- No. 54, Statement of Operations, 1887-1913 inclusive (R. 3298).
- No. 55. Statistics of other Michigan Railroads (R. 3312).

Defendants':

- No. 3, Robertson, Report of Council Committee, Marquette (R. 2401-2405).
- No. 13, Delf's Compilation of Freight-train Speed (R. 4238-4242).
- No. 24, Summary Sheet of 1902 Appraisal (R. 5111).
- No. 25, Summary Sheet of 1905 Appraisal (R. 5117).
- No. 28, Letter on Land Values, from A. E. Miller (R. 5226-5228).
- No. 46, Delf, Additions and Betterments, 1900 to 1913 (R. 7925-7933).

There are two of Complainant's exhibits numbered "90," one being a copy of a letter from Mr. Eldredge to the Interstate Commerce Commission, and the other being Tax Commission Field Notes, above referred to. The former is returned to the Court, the latter is not.

73–325 Defendants' Exhibits Nos. 66 to 70 inclusive were erroneously marked with the numbers 94 to 98 inclusive.

Dated October 24, 1916.

A. B. ELDREDGE, Of Counsel for Complainant. ROGER I. WYKES, Of Counsel for Defendants.

Filed February 1, 1917. ELMER W. VOORHEIS, Clerk.

(Here follows report of Herbert L. Baker, Special Master, filed Feb. 1, 1917, printed as a separate volume.)

17.

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United States District Court, Eastern District of Michigan, Southern Division. In Equity.

No. 4117.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Complainant,

VS.

Grant Fellows, Cassius L. Glasgow, Lawton T. Hemans, C. S. Cunningham, et al., Defendants.

Defendants' Exceptions to the Report of the Special Master.

Now come the above named defendants, and severally and collectively take the following exceptions to the Report of the Special Master, dated January 28, 1917, filed February 1st, 1917.

Exception No. 1.

General Overruling Objections to Tentative Report.

That they except to the action, conclusions, determinations and findings of the Master in overruling and refusing in whole or in part to make the corrections and alterations in his tentative report indicated by the several objections presented on the part of the defendants to such report as submitted to counsel for the respective parties of which the final report is largely a copy, such objections being set forth in the final report of the Master on pages 417–469 inclusive, and the specific objections overruled by the Master appearing upon the face of the report and being enumerated as follows, to-wit:

327 Objections numbered 1-24, both inclusive, and 26-29, both inclusive.

That the objections to said report so set forth are hereby intended to be renewed as exceptions, and that wherever the right is therein reserved to present a specific exception to the court, such exception is herein, whether repeated or not, intended to be presented to the court as an exception to such report.

Exception No. 2.

Estoppel—Land Grant Condition.

They except to that finding and conclusion of the Master discussed and determined on pages 18-30 of such report, that as a matter of law complainant is not bound or estopped by the conditions attached by law to the receipt and acceptance of land grant lands through the acceptance of land grant lands by itself or its predecessors in ownership, from questioning the validity of the Michigan passenger rate statute as found in Act 276 of the Public Acts of 1911 fixing the rates of fare to be charged upon the complainant's railroad in Michigan of two cents per mile for the carriage of passengers.

Exception No. 3.

Decree, Objection to, and Form and Findings of.

That they except to the findings and conclusions of the Master as expressed and set forth in the proposed form of decree set forth in said report on pages 407 to 409 thereof, and to the conclusion and determination therein that the rates of fare fixed by Act 276 of the Public Acts of Michigan of 1911 are, or will if enforced be, confiscatory of the property of complainant or will operate to deprive it of its property without due proces of law, and that said Act is in violation of the Constitution of the United States as applied to complainant and to the conclusion, finding and determination as expressed in said form of decree that the defendants and their successors, or any of them, should be restrained and enjoined from attempting to compel the complainant to put into force the rates in said statute fixed or from taking action or proceedings against

complainant or its representatives to enforce the penalties
328 prescribed by law for a violation of the terms of said act,
and to the finding and determination as expressed in said
form of decree, that the defendants therein named as selected individuals representing the traveling public, be restrained from instituting proceedings against the said complainant.

Exception No. 4.

General, to Determination of Confiscation.

That they except to the entire of such report in that the said Master erred in his conclusions, determinations and findings in substance and effect that the statutory rate of fare prescribed by Act 276 of the Public Acts of Michigan of 1911 is conficatory or insufficient or inadequate or that the enforcement of such statute will invade the constitutional rights of the complainant or will operate if enforced to deprive it of its property without due process of law, and that by reason thereof the enforcement of the rates there fixed or the operation of the statute as applied to the complainant in the operation of its intrastate passenger business ought to be restrained.

Exception No. 5.

Burden of Proof.

They object to the said report and to the conclusions and determinations and findings thereof as expressed in pages 31 to 61 thereof in overruling the contention of the defendants that as a matter of law the burden of making full and positive proof in order to overcome the validity of a rate fixing statute is upon the complainant and that it is essential that the complainant prove beyond controversy and beyond the possibility of a reasonable doubt every fact, element or thing upon which a decision of invalidity or confiscation or of insufficiency of net earnings in the regulated service is predicated.

They further except that in a number of instances throughout the report the reasonable doubt has been resolved in favor of the complainant and against the validity of the statute and the 329 rate. A few of the particulars which are pointed out as

illustrative are the following:

(a) In making charges or in allowance for additions to property schedules for the items of contingencies at \$400,000, taxes at \$100,000, appreciation and solidification at \$300,000 and working

capital, stores and supplies at \$339,918.

(b) In refusing to depreciate the items of ballast and track laying and surfacing in the face of testimony to the effect that those items of property do in fact depreciate and now exist and did in 1910-1913, inclusive, exist, upon complainant's railroad in a depreciated condition.

(c) In the acceptance of the complainant's alterations of the defendants' modified revenue train mile ratio for the division of the common property and common expenses of the complainant between

passenger and freight service.

(d) In the determination that the decreased rates of fare now provided for by statute will not, if put into effect and that the decreased rates of 1907 did not subsequent thereto, produce increases in traffic or did not produce increases of traffic sufficient to offset in whole or in large part the decrease in revenue per passenger mile caused thereby.

(e) In refusing to eliminate from the operations of the complainant necessary to furnish the service required at two cents per mile the other more expensive and less profitable operations of the complainant in the carrying on of its outside operations including sleeper

and diner service.

As incidental to this exception they also except to the refusal of the Master to find or to hold in substance or effect, that the character, extent or effect of the presumption of validity does not depend upon proof or inference of the legislative knowledge or upon its want of knowledge or upon its means of knowledge, or the extent of its investigations, and they insist that it is a positive presumption that the law is valid unless all conditions which would render it invalid appear absolutely and they except to his holding, finding and setting forth of the contrary doctrine.

Exception No. 6.

Rule of Reasonable Doubt.

That they except to so much of said report as discusses, applies, adjudicates or determines the rule of "reasonable doubt" or the presumptions applicable in rate cases or the burden of proof or degree of proof required, as found on pages 31 to 61 of the report in its entirety without setting out specific language used for the 330 reason that a great multitude of separate paragraphs, sentences and clauses thereof are objectionable, and the objectionable matter is so interwoven with that which is proper as to render it inexpedient and confusing to attempt to separate and base separate exceptions upon each objectionable clause or series of clauses and as to render the entire discussion and conclusions upon the subject improper.

Exception No. 7.

Sufficiency and Character of Proof.

That the said report and its several findings are excepted to as erroneous and improper in that upon the showing made by the complainant the Master should have determined that the proofs, testimony and exhibits were insufficient to sustain or to permit a determination of confiscation in that the proofs are indefinite, that the divisions of expenses between passenger and freight services were dependent upon arbitrary assumptions and upon general opinions not represented by or shown in accounts kept for the purpose of showing the amount of expenditures incurred for the various services and were not based upon actual experience or shown to be derived from the keeping of suitable accounts, at least during typical periods which would furnish statistical information bearing upon the separation of costs to the several services. That the proof of matters of such intricacy should not be permitted to rest upon general expressions of judgment, and that the proofs do not fulfill the burden incumbent upon complainant to establish the claimed invalidating facts by definite and convincing proofs, but represent an attempt on the part of complainant after having assailed the constitutionality of the State act, to rest upon expressions of judgment when it had in its power to present accurate data which would permit the court to draw the right conclusions?

Exception No. 8,

Determination of Legal Principles.

They except to the report of the Master and to his conclusions and determinations in deciding in favor of the complainant and against the contentions of defendants upon each of the eight distinct points of defense listed and set forth in said report.

on pages 400-401 thereof, in the language following:

"This method of division proposed by defendants would, if adopted, defeat the complainants' case, and it is one of a number of distinct points of defense, any one of which if sustainable would also defeat the complainants' case. Those points of defense are eight in number and are as follows, viz.:

1. That the complainants are estopped from contesting the validity

of the statute by the acceptance of land grants.

2. That the value on which complainants are entitled to a return

is commercial value and that the same has not been proven.

3. That the common property and expenses must be divided between passenger and freight on the basis of time of occupancy as proposed by defendant.

4. That the sleeping and dining car service must be treated as outside operations and not a part of the service to which the prescribed

rate applies.

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5. That the complainants must prove every material fact beyond

the possibility of a doubt.

6. That the presumption in favor of the statute although disputable in theory is indisputable in fact,

7. That the complainants must prove by affirmative evidence that the loss from decreased rates will not be overcome by increased traffic.

8. That complainants must prove what percent of return they are entitled to; that they have failed to make such proof, and are therefore not entitled to the relief prayed for.

If any one of these points of defense is sustainable the complain-

ants' case must fail.'

Exception No. 9.

Rate of Return.

They except to such report in its entirety and to the several determinations and findings thereof which resulted in the conclusion that the rate of return to complainant to be expected upon the value of the property employed by it in its Michigan intrastate passenger business under the rates prescribed in said Act 276 of the Public Acts of 1911, is or would be but 2.24%, and that such rate of return upon such property amounts to a deprivation of complainant's property rights in violation of the Fourteenth Amendment of the Federal Constitution, and they except to all findings and determinations upon which is based any conclusion that a less rate of return than 8% on

such property is shown with such statute in operation, and they specifically except to the conclusion, and to the several findings upon which it is based, stated on page 391 of such

report as follows:

"I have found (1) the entire value of complainant's property to be \$13,901,938; (2) the value of the property employed in the complainant's Michigan intrastate passenger service to be \$2,741,872; (3) the rate of return to be expected thereon under the prescribed rate to be 2.24 per cent, and (4) the rate of return to which the complainants are entitled under the constitution to be 6.5 per cent."

Exception No. 10.

Rate of Return.

They except to the conclusions, determinations and findings of the Master upon the subject of the rate of return to which complainant is entitled on its whole property in Michigan engaged in serving the public as well as upon that part of its property engaged in performing its intrastate passenger operations in Michigan, as embraced in pages 377 to 390 of the report, and also except specifically to the finding, on page 389 thereof and repeated on page 391, that the minimum rate of return to which complainant is entitled under the constitutional guaranty of the Fourteenth Amendment is 6.5 per cent, and specifically except to the several incidental or corollary conclusions and findings upon which the same is based as follows:

(a) That the complainant is entitled to a greater return than the current rate of interest at 5% upon money loaned without specific

contract arrangements.

(b) That there is any testimony or evidence in the case or that the Master may take judicial notice of practices and customs or the experience of the community, of such a character or in such a manner as to predicate thereon a determination that complainant is entitled to a fixed or minimum rate of return of 6.5% or that a rate of return of more than the current rate of interest is expected by investors generally, on investments of similar hazard in the community in which complainant's railway lies.

(c) That, as stated on page 386 of the report, the rate of interest provided by statute where no rate is stipulated has no relation whatever to the question of what would be a proper rate of return from a given property investment or from the investment in complainant's property on the case presented to the Master on the record in this

cause.

(d) That the complainant is entitled to a greater rate of return than is paid as interest on its bonded indebtedness, which is greater than the value of its property.

(e) That capital could not be induced to reproduce and operate

this property by a prospective return of less than 8 per cent.

(f) That he resolves doubts in favor of defendants in finding the minimum rate of return to which complainant is entitled by taking a

point half way between the interest rate on money without contract

and such 8 per cent.

(g) That where the statutory regulation is of a part of the business only, the complainant is entitled to a full return upon the property engaged in the regulated part of the business as against a claim of confiscation and to the same rate of return to which it would be entitled, if its whole rate schedule on all branches of its business were in litigation.

Exception No. 11.

Rate of Return.

That they except to so much of said report, found on pages 394 et seq., as discusses the relative rates of return from passenger and freight services and to the determinations and findings based thereon, and particularly to such part thereof as bears upon or supports the inference that a passenger rate, sufficient in itself to support the property engaged in carrying under it, can be affected or made insufficient by being combined with freight rates which are insufficient, and they insist that it is incumbent upon a complainant before it can be entitled to relief on the ground of confiscation, to show confiscation in fact through the denial of sufficient earnings from the regulated service at the rates being questioned, to support the fair proportion of the property actually devoted to that service.

Exception No. 12.

Values in General.

They except to the discussions and determinations in such report, upon page- 65 to 87 thereof, upon the questions of "value" and "value proper for use in rate cases" for the reason that the same is predicated upon erroneous premises, is supported by untenable arguments, is based upon faulty reasoning and does not properly lay down the rules applicable in rate cases. This exception is made to the entire discussion, for the reason that to except to each erroneous passage thereof would make these exceptions unduly prolix and confusing.

Exception No. 13.

Values, Cost of Reproduction.

They except to said report as being erroneous in its several findings and conclusions and particularly as discussed and set forth on pages 62 to 87 thereof, that as a matter of law the "cost of reproduction value," less depreciation, or "the replacement cost value" is to be taken as the absolute measure of the value which must be sustained by the rates permitted by law to be charged, and except to the findings that inasmuch as the rates fixed do not pay what the Master finds to

be a fair rate of return upon the value thus arrived at, the rate fixed is unremunerative or confiscatory.

Exception No. 14.

Values, Commercial, as Limiting.

They except to such report and to its findings and conclusion as matters of law and fact as expressed between pages 62 to 87 thereof, that the cost of reproduction value of the property upon which complainant is entitled to a return can, or does exceed its commercial value or can or does exceed the consideration at which the public could acquire the full title to such property through exercise of its power of eminent domain.

Exception No. 15.

Values, Intrastate Passenger, Too High.

They except to the finding and conclusion, as expressed on page 391 of such report and at other places and exhibits therein, that the value of the entire of complainant's property devoted to its intrastate passenger business in Michigan is as much as \$2,741,872, or that it is greater than the \$1,547,888 shown by defendants' claimed value, or that the value of complainant's property devoted to its entire freight business, or to its interstate or intrastate freight business, or to its interstate passenger business, is so small in proportion to the amount devoted to its intrastate passenger business, as he finds it to be; otherwise stated, the exception is that too large a proportion of property is found to be devoted to intrastate passenger business and too small a proportion to other classes of business.

Exception No. 16.

Values—Specific Criticisms.

They except to such report, and its several findings and conclusions appearing on pages 62 to 242 thereof, in that the value of complainant's property engaged in and devoted to, its business in serving the public in Michigan as adopted by the Master at \$13,901,938, is excessive, is greater than its actual value and is greater than the cost to replace or reproduce the same, less depreciation, and is greater than the, or any, value thereof, that complainant is entitled to support by Michigan statutory rates of charge, and is greater than the, or any, value thereof, that the public is required to support; that such excessive, erroneous and inflated value is due to the considerations mentioned in the other exceptions herewith made, and to the following:

(a) In arriving at, and in fixing the values fixed and listed for the various descriptions of real estate and right of way, the Master includes improper values, and improper elements of value and proceeds upon erroneous theories of value, in that, to-wit: (1) On pages 88 to 90 and 114 of the report, strategic or special values are improperly attributed to and included for, certain lands on

account of their claimed adaptation for railroad purposes.

(2) On pages 91 to 95 and 115 of the report riparian and other water rights not in actual railroad use, are improperly allowed as being appurtenant to lands of complainant at St. Ignace, Marquette and Houghton.

(3) On pages 95 to 99 of the report, certain trackage rights existing in streets in the cities of Marquette and Ishpeming and erro-

neously included.

(4) On pages 99 to 107 and 115 of the report, mineral and ore values in and under the right of way, and speculative values due to the possibility of discovery of minerals under the right of way are improperly allowed.

(5) On pages 107 to 118 and 115 of the report, land values generally are taken, and are in the findings used, which are excessive and

contrary to the weight of evidence.

(6) Pages 107 to 118 of the report show improper reliance upon testimony of witnesses placing high values, and a refusal to take the testimony of witnesses equally entitled to credit and equally well qualified to fix values, whose values were well considered, and who fixed lower values and the refusal to apply proves tests of the corectness or incorrectness of opinion evidence of value, which tests show the values used by the Master to be excessive.

(7) The refusal to take into account, or be influenced by, values fixed by actual purchase and sale of similar, nearby and adjacent

lands.

(8) On pages 124 et seq., the allowance of additions to values for clearing and grubbing, which operates to bring the values of complainant's lands above the values of similar nearby and adjacent cleared lands.

(b) In arriving at and fixing such values for real estate and right of way, the Master proceeds upon erroneous and improper methods

of valuation, in that, to-wit:

(1) Lands in considerable or large tracts are considered and valued upon the basis of adjacent or nearby lands subdivided into small lots, and upon the basis of present demand for and immediate sale of the whole of such lands at prices which were paid for a small number of lots out of a larger number in the vicinity.

(2) The assumption is given effect, that there would be immediate demand, at high prices, for all the South Shore lands now occupied

by the railroad.

(3) The detrimental effect of the railroad, as giving a lower value to lands in its immediate vicinity for other than railroad purposes, was not taken into account, in that the railroad lands were considered of the same value as, and favorably compared with, residence and high-class business property located in bet-

ter parts of the municipalities where those lands lay.

(4) Principal and main streets in municipalities were assumed to be projected through and on to the lands of complainant, and it was assumed that there would be immediate demand for all railroad lands thus assumed to be on such streets, for the same uses as occupied lands now on such streets or in the vicinity are now devoted to.

(5) Values which are based upon purchases for railway purposes are accepted, resulting in the inclusion of the value, and elements of value, for railway purposes forbidden under the Minnesota Rate Cases.

(c) In valuing the property of complainant, the Master places

high and excessive values, in that:

(1) He found the total value of the lands of the complainant in Michigan to be \$1,780,239, whereas the true value, and the value proper for use in a rate case, was, and is, much less, excessive values being placed upon the lands in each of the counties of Chippewa, Mackinaw, Schoolcraft, Marquette, Baraga, Houghton, Ontonagon and Gogebic.

(2) On pages 95 to 99, he valued trackage rights in streets (erroneously included) at much in excess of cost to produce, or to reproduce, and in excess of any value therein belonging to complain-

ant.

(3) On pages 118 to 124, he assumed that to reproduce the earth grading upon complainant's line would cost thirty cents a cubic yard, whereas, the true cost to reproduce, and the real reproduction value and the value proper for use in this proceeding does not exceed an average of twenty-five cents a yard.

(4) On pages 134 to 136, he finds a unit price for ties of thirtynine cents each, notwithstanding the records and reports of complainant to public boards in Michigan show tie prices to be considerably less, and notwithstanding the actual purchase price and value

of ties is and has for several years been less.

538 (5) Notwithstanding the weight of the evidence shows that ballast does depreciate and that it must be renewed and replaced from time to time, to keep it in 100 per cent condition, and that it now exists on complainant's railroad in a depreciated condition, he, on pages 138 to 145, refuses to allow for its depreciation, and erroneously finds and determines that there is no depreciation in it.

(6) On pages 145 to 157, he adopts as the price or value, or cost of reproduction, of "Tracklaying and surfacing" \$600 a mile, whereas, its real value or reproduction cost is not shown by the preponderance of evidence to exceed \$526 a mile on complainant's rail-

road.

(7) He refuses to depreciate "Tracklaying and surfacing" though the same does depreciate and now exists and did in 1913 exist, in complainant's railroad in a depreciated condition, and though the track structure, made up of ties, rails, frogs, switches and crossings, track fastenings, and track laying and surfacing as a whole does depreciate, and is now and was in 1913, in a depreciated condition, and the track laying and surfacing, as a whole does depreciate and was and is in fact depreciated in like proportion as do and are the other items of the track structure.

(8) On pages 180 to 182, the value is improperly increased and enlarged by allowance for and addition to property values of, a con-

structive percentage of two per cent as "Engineering on Equipment."
(9) On pages 147 to 203 he adds on account of "Contingencies," \$400,000, without sufficient proof that contingencies in that, or in any account, existed in the property or would inevitably occur in a reconstruction, or were incurred or paid for in construction of the property and against the contention that such item is not proper for allowance in rate cases.

(10) On page 204, he allowed and included in the value of complainant's property, on account of "Legal Expenses during Construction," \$51,400, notwithstanding the weight of evidence indicates that

the allowance therefor should not exceed \$25,000.

(11) The amount allowed on pages 207 to 219, as "Interest during Construction" is more than any proportion of the value of complainant's road attributable thereto, is greater than any amount shown to have been expended thereof by complainant out of capital, and is greater than any amount which would be expended in the event of reproduction.

(12) The allowance, on pages 203 to 218, of \$100,000, on account of "Taxes during Construction," is improper, as there is no proof that taxes would be paid, or of the amount that would

be paid, in case of reconstruction, or what was actually paid during construction, and during the period of construction of complainant's railroad, taxes were imposed upon gross earnings of railroads, the property being exempt.

(13) The allowances and additions, on pages 219 to 224, on account of "Working Capital" and "Stores and Supplies" are excessive, in that the amount allowed for stores and supplies is ample for both

items.

(14) The amounts allowed for depreciation upon various of the

elements or items of property are insufficient.

(15) The amount of \$300,000 added to the appraisal on pages 224 to 234, on account of "Appreciation" is not sustained by the evidence and the existence of any appreciation in the roadbed of complainant, which would increase its condition above the 100 per cent inventoried and included in the appraisal, is not proven, and there is no proof from which it is possible to find that appreciation of \$300,000, or any other amount, exists in complainant's railroad. Nothing was included in complainant's inventory for appreciation, and no notice or intimation was given of a purpose to claim or add for it, until the argument.

(16) The allowance, or addition to the property, of items listed in schedule No. 39, pages 206-7 of the report, under "Organization, administration and general expenses during construction" is improper.

(17) The exceptions to the value of the property and the particulars stated are not intended to exclude other exceptions which are comprehended in the general exception to the fixing of the value of the Michigan property at \$13,901,938, and the right is reserved to specify objections to every item of property entering into the final value.

Exception No. 17.

Values-Contingencies.

That they except to so much of said report, appearing on pages 194-

195 and 203, as is hereinafter set out, as follows:

"From the foregoing evidence, I find that in the reproduction of complainant's property, there are costs which are certain to be incurred for certain purposes which can be foreseen, and the amount of which can be estimated with reasonable certainty; that according to universal experience, the total cost of reproducing the property will exceed the total of the costs, thus foreseen and estimated

by reason of additional costs arising from mistakes and un-340 foreseeable happenings, that these additional costs are by their very nature such that their amount cannot be foreseen or estimate l in the manner and with the degree of certainty that the foreseeable costs can be estimated, but that they can be estimated on the basis of general experience and the law of averages; that according to such experience these additional unforeseeable costs usually amount to, on the average from ten to fifteen per cent of the total of the estimated costs of Schedules 3 to 28 inclusive, that, according to the weight of evidence in this case, the amount of such unforeseeable costs to be estimated on the reproduction of complainant's property would be ten per cent of the total of the estimated costs of Schedules 3 to 28 inclusive, amounting to the sum of \$782,306; that although an allowance of this amount would be supported by the weight of evidence I do not make such allowance, but in view of the uncertainty pertaining to the subject, and on the principle of resolving all doubt in favor of the defendant. I have decided to allow for contingencies the sum of \$400,000, the same being little more than one half of the amount last named and more than \$79,000 less than the amount allowed for contingencies by the defendants' expert, Mr. Hansel." (Pp. 194-195.)

"From all the evidence in the case, I am convinced beyond a reasonable doubt, not that the \$400,000 which I have allowed for contingencies is the exact amount of the additional costs that would be incurred in the reproduction of complainant's railroad resulting from contingencies, but that that amount is a fair and conservative estimate of the minimum of such additional costs, arising from contingencies not taken into account in the other estimates." (P. 203.)

Exception No. 18.

Values-Appreciation.

That they except to the entire discussion, conclusions and findings of the Master upon the subject of appreciation, as comprehended in the report on pages 225 to 234 inclusive, and particularly to so much of said report as finds there is proof of the amount of appreciation existing upon complainant's property, or that the fact or the

existence of appreciation is proved by contradicted evidence, or that appreciation of the character described and allowed for, is proper for addition in a rate case, or that the proof upon or the question of law or fact involved, in any of those assumptions, appears in this case beyond possibility of reasonable doubt.

Exception No. 19.

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Values, Created by Operating Expenses, Deduction of.

They except to such report and to its conclusions and fin lings as erroneous, in that it finds the value of the property of complainant and of the portion thereof attributed to, and which is required to be supported by, the Michigan passenger business, to exist in too great an amount and value, due to the failure to make deduction therefrom for that part thereof created or paid for out of operating expenses, and on page 241 et seq. thereof, the Master refuses to make such deduction; that the amounts of property created out of operating expenses are indicated by the testimony to be large, that it was incumbent upon complainant to show the amounts thereof, in order that they might be deducted from the value and that in the absence of such proof, no finding of a value of complainant's property which should be supported by rates was possible.

Exception No. 20.

Values, Contributed by Public, Deduction of.

They except to such report on the ground that its conclusions and findings are erroneous in failing to find, and deduct from the value of complainant's property to be supported by rates, as claimed by defendants, the value of property included in the inventory, which was contributed to complainant by the public for railroad use, and in determining on page 239 thereof, that property so contributed or obtained is properly added to the inventory and made a part of the value to be sustained by statutory rates.

Exception No. 21.

Values, Division of Common Between Passenger and Freight.

They except to the division between services of property used commonly in passenger and freight services, as made in such report on pages 245, et seq. thereof, as erroneous in the particulars, severally and collectively, as follows:

(a) That neither the basis of the time of use by the respective services, as proposed by defendants, nor the alternative basis, using the modified revenue train-mile ratio, as computed by defendants, was used.

(b) That the amended modified revenue train-mile ratio, as adopted, is erroneous, as it attributes to passenger business a greater

amount, volume and value of property, and to the freight business a lesser amount, volume and value of property, than is used by them respectively. The errors therein are in each of the particulars, and the exception is for the reasons severally and collectively, that:

(1) It does not give effect to the time, value or amount of use by

the respective services.

(2) In the elimination from the percentage as is done on pages 256 to 267 of the report, of the time of freight trains engaged in stational service of the part of their time spent on exclusive freight tracks, too large an amount of time is deducted, due to the use of too great a mileage of exclusive freight track, and of too small a mileage of common track, and due to the assumption that the volume of use or stational time per track mile, is the same for both common and exclusive tracks.

(3) In dividing as described on pages 256 to 267 of said report, that statistical switching mileage of complainant between passenger and freight business for addition to the train mileage to reach the modified train-mile ratio, too great an amount of switching mileage is attributed to exclusive tracks and too small an amount to common

tracks.

(4) In arriving at the modified revenue train-mile ratio which the Master uses, the applicable presumptions of law are reversed by him, and, instead of resolving the doubts which existed in favor of validity of the statute and rate, he resolved doubtful questions against the sufficiency of the rates.

(5) The division made of common property between passenger and freight services, is dependent solely upon opinion, without ade-

quate supporting data.

(6) The deductions and recomputations by which complainant alters defendants' modified revenue train-mile ratio, which deductions and recomputations are accepted by the Master as described on pages 256 to 267 of the report, depend largely on the assumption of unproven conditions, on which there is no testimony; the assumptions without evidence being:

That stational service occurs in equal volume on exclusive and on

common tracks.

343 That the statistical switching mileage is made on exclusive tracks in the same relative proportion per track-mile

as it is made on common tracks.

(7) Certain mileage of exclusive ore trackage upon which no stational time is spent or stational mileage made, and upon which none of the time of freight trains comprising the 39.01 per cent of stational time is spent, is used in setting off stational time to exclusive freight trackage, whereas in fact it should not be used because no stational time is included for it. The detail of such mileage is as follows:

American Mine Branch 2.	96 miles
Republic Mine Branches 1.	48 miles
Champion Branch	97 miles
Imperial Mine Branch 2.	80 miles
Beaufort Mine Branch 1.	10 miles

(8) Certain exclusive freight track not operated in 1912 or 1913, and some abandoned exclusive freight track, is included for the purpose of drawing to it, and away from the common trackage, a portion of the stational time, for the purpose of reducing the freight side of the modified revenue train-mile ratio. As such mileage was not in existence or was not used, it results that no stational time could have been spent on it, and, therefore, it is not to be used in reducing expenses due to stational time upon it, as exclusive freight trackage. The detail of such mileage is as follows:

		N .1									miles
Danaher Branch	and les	Northern		 00	op	e	r a	12	e,e	8.38	miles
Old Nega	unee M	ine Branch	1							.96	miles

Exception No. 22.

Report Based on Operations of a Single Year.

The defendants except to the refusal of the Master, as shown on record pages 10716-10718, and mentioned on report pages 363 to 366, to permit the introduction of, or to consider, the report showing complainant's passenger and other earnings for the fiscal year 1914, and except to such report in its entirety as not including any findings, determinations, values, expenses, earnings and net revenues as relating to operations since June 30, 1913.

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Exception No. 23.

Unearned Increment as Income.

They except to the conclusion and finding as expressed on page 323, et seq. of said report and given effect therein, that the unearned increment in lands and other property, due to increase in values which complainant has been permitted to include in the value of its property and held to be entitled to a return upon, is not an income and is not to be considered in determining the sufficiency of the rate of return as against the claim of confiscation.

Exception No. 24.

Revenues-Mackinaw Transportation Company.

They except to said report, and to its conclusions and findings, on pages 173 et seq. in that the amount of earnings set apart and used as the net passenger revenue to support the property used in complainant's passenger business is deficient in that, none of the revenues from passengers carried in complainant's cars over the Mackinaw Transportation Company's carferries, are included, and that the reasons for such exclusion as expressed on such pages thereof are insufficient.

Exception No. 25.

Revenues-Sleepers and Diners.

They except to the assumption in said report and to the incident findings based thereon, on page 405d, that the revenues from the operation of sleeping cars are allocated between states and insist that the proportioning of the revenues from the operation of sleeping cars, between states is on an arbitrary basis, the nature of which was not disclosed, and that the revenues from this source should be divided on the basis of direct revenues from the carriage of passengers which would attribute to Michigan \$34,364.40 instead of the \$30,243.11 of revenue which was considered by the Master as the Michigan proportion of the revenue from sleeping cars.

345 Exception No. 26.

Revenues-Mail Service.

They except to such report and to the findings and conclusions thereof, in fact in the division of the revenue from the service of carrying the mailes, too small an amount of the unallocatable revenue therefrom is assigned to intra-state business, and too large a proportion is assigned to interstate business.

Exceptions 25 and 26 are only applicable in case outside operations are declared to be an integral part of the passenger business in de-

termining the sufficiency of the statutory rate.

Exception No. 27.

Operating Expenses-Those for Single Year Used.

The defendants present an exception that such report on pages 282 et seq. is erroneous in its findings and determination, that the operating expenses for the four years, 1910-1913, are not taken and used for testing the validity of the statute, instead of those of 1913 and that those for the later years 1914 and 1915 were not required or permitted to be introduced.

Exception No. 28.

Operating Expenses—Those for Single Year Used.

That they except to said report in that its findings are permitted to stand and are based upon, the accounts, value of property, earnings, and expenses for a single year, whereas there were before the Master accounts and values for at least four years, and there were also available the accounts for other and later years.

Exception No. 29.

Operating Expenses—Elimination of Sleepers and Diners.

They except that said report, and its conclusions and findings as set forth on pages 284 to 308b thereof, are erroneous, as the expenses of operation of sleepers and diners are not eliminated from 346 the operations of carrying passengers at two cents per mile, and there is not eliminated, as part of the expenses of such outside operations, not only the added (or "out of pocket") costs by reason of doing such business, but also a proper proportion of all costs attributable thereto.

Exception No. 30.

Operating Expenses—Sleepers and Diners.

That they except to the entire discussion, conclusions and findings upon the subject of sleeping and dining cars and outside operations as set forth in said report, on pages 285 to 308 B, inclusive, and to the several computations, exhibits and tabulations through and by which the erroneous principles there laid down, (namely, that the outside operations including sleeper and dining services, are an integral part of the business of carrying passengers at the rate of two cents per mile, and that therefore the expenses of such sleeper and diner service are to be considered as part of complainant's passenger expense in determining the sufficiency of the regulated rates), are arrived at or carried into effect.

Exception No. 31.

Operating Expenses—Still Abnormal.

The defendants except to said report, in that the amounts on pages 278-280 thereof, deducted from the operating expenses of 1913, to eliminate abnormal expenditures, expenditures for additions and betterments, and expenditures for deferred maintenance, so as to reduce the expenses of that year to a normal amount, are insufficient, and that, after the elimination of the amounts deducted, the expenses used for 1913, are still abnormally high and still include expenditures to make good the depreciation of other years and for additions and betterments.

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Exception No. 32.

Operating Expenses—Annual Depreciation.

The defendants except to so much of said report, found on pages 272-275 thereof, as apparently determine- a public utility, whose

property is kept on a fixed or rising level or percentage of physical condition from year to year, out of operating expenses, to be entitled to reduce the net income by a charge for an annual depreciation or a theoretical depreciation of the current year, particularly in view of the evidence which shows the condition of complainant's railroad, in 1912 and 1913, was improved out of operating expenses, and that charges for depreciation of equipment and docks had already been made to operating expenses.

Exception No. 33.

Operating Expenses-Depreciation.

That they except to the language used and finding set forth in said report on page 277 thereof, as follows:

"Complainant further asks me to find, in this connection, and I do find, that it is the rule of law that — public service corporation must be allowed sufficient revenue to pay its operating expenses, to keep up its property and to pay a fair return on the investment; that in accordance with this rule, such a corporation is entitled to and should charge off each year, in addition to its operating expenses, a sufficient sum to take care of the annual depreciation of its property; that the testimony shows that complainant has not, in its accounts, charged depreciation on any of its property except equipment and ore docks; and that to represent a true statement of the financial results of complainant's operations, there should be added to the

Exception No. 34.

operating expenses of each year, as shown by the company's books, an additional amount to take care of the depreciation on the remainder of the property on which no depreciation has been charged."

Operating Expenses-Adjustment to Normalize.

They except that said report is erroneous in the statement and conclusion, on page 278, that:

"If the tie prices paid in 1913 had been in effect in the three preceding years and if in each of the four years a proper charge had been made for annual depreciation on the bridges, trestles and culverts on complainant's road in Michigan, to say nothing of depreciation on buildings and other property, which depreciation I have not attempted to compute, the average Michigan operating expenses of those years would have been increased by \$70,159; the average Michigan passenger operating expenses would have been increased by \$21,769; and the average Michigan intrastate passenger expenses would have been increased and therefore the average Michigan intrastate passenger net income reduced by \$13,-346.

Exception No. 35.

Operating Expenses-Separation to Exclusive Freight Tracks.

That they except to the method followed by the Master, on pages 367-376 of the report in setting off to exclusive freight service the expenses of maintenance and operation of exclusive freight tracks in that:

(a) An insufficient amount is set off to such exclusive freight

tracks.

(b) That the \$300 per mile used for industrial spurs and the \$375 per mile used for nine branches is insufficient to represent the

real cost of maintenance of such tracks.

(c) That the division of the expenses of maintenance of side track mileage upon a 3 to 1 equation sets off to freight an insufficient amount of expenses in that the testimony shows the ratio of equation to be 2 to 1.

(d) That certain of the exclusive freight tracks, namely, 4.23 miles Negaunee to Winthrop is treated as common, though it is in

fact exclusive freight mileage.

(e) That certain of the items of expense occurring upon exclusive tracks are not set off to it. The expenses referred to being described in the Master's report on pages 331-3.

Exception No. 36.

Operating Expenses—Division of Account 91 Between Services.

Exception is taken, to so much of said report as set forth on page 340 et seq., as divides account number 91, "Crossing Flagmen and Gatemen," on the basis used, made up of a combination of the revenue train mile and switching ratios, or on any ratio less favorable to the passenger service, than the ratio of switching in passenger and freights.

Exception No. 37.

Operating Expenses-Common-Division Between Services.

They except to the conclusion and finding, as expressed in said report on pages 245 to 267 thereof, that common expenses not otherwise divided between or allocated to passenger and freight services are properly to be divided, and to the Master's practice in dividing the same, on the basis of the modified revenue train-mile ratio as computed by complainant or as adopted by the Master, for the reasons, severally and collectively, that:

(a) The method used disregards the actual volume and time of use, which are the proper factors for dividing that part of those expenses incident or due to weather and time, and not to train move-

ment; it also disregards and gives no effect to the gross ton-mile ratio, which is to be considered in dividing those expenses which are due to train movement, and which are the result of wear and of

the use of the tracks and road bed by trains.

(b) The method used passes over, and the Master refused to apply, a basis which is as favora' le to the validity of the rate as is the defendants' modified revenue train-mile ratio, which ratio more nearly approximates correct results than does complainant's modified revenue train-mile ratio, though even the defendants' modified revenue train-mile ratio reaches results too favorable to complainant.

(c) The method used divides expenses due to time and weather

upon a basis having no proper relation to their causes.

(d) In the computation of the modified revenue train-mile as adopted and applied by the Master, the several imperfections, which are hereinbefore described and set forth in Exception No. 21 appear and are herein, so far as applicable, repeated as applying to the division of common expenses.

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Exception No. 38.

Operating Expenses-Revenue Train Mile, Division of.

That they except to so much of said report as is found on page 251 thereof as follows:

"My conclusion is that the extent of the use made by each service of the common property in the operation of revenue trains is to be measured by the distance moved by the trains and not by the time consumed in making this movement; that the unit of use is therefore, a distance unit; and that the property is to be divided on the basis of the number of miles traveled by the trains in each service respectively."

and to all discussion, findings and determinations upon which the conclusion stated is based.

Exception No. 39.

Loss of Freight Engine Power Due to Passenger Service.

Exception is taken, to so much of said report as expressed on page 334, et seq., and 335, et seq., thereof, as finds that there is proof of loss of power in the freight engines due to any super-elevation of curves for passenger service, or as finds that any amount can be fixed for the cost thereof measured by use of fuel, or in any other manner or as assumes or finds any super-elevation of rail to exist, or to have existed on the D. S. S. & A.

Exception No. 40.

Excessive Maintenance for Passenger Service.

Exception is taken, to so much of said report as expressed on pages 334 and 337 thereof, as finds the evidence to show that complainant's line is better maintained because of the passenger service thereon, than it would be or then necessary if it was maintained for the freight service of complainant's line only, or that the net results from freight service would be greater if the line were maintained at a lesser cost.

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Exception No. 41.

Freight Expenses Caused by Passenger Service.

They except to the portion of said report found on pages 337 and 338 et seq., which carries the inference that expenses are or were in 1912 or 1913, on the D. S. S. & A. charged to freight service, which would more properly be charged to passenger service or which are or were caused by or for passenger service, or that the amount- of any such expenditures or costs are determinable or are properly determined in the amounts there fixed or set forth.

Exception No. 42.

Operating Expenses—Division Between Inter and Intra State Passenger.

Exception is taken to the division of common Michigan passenger expenses between intrastate and interstate services on the ratio of the number of passengers carried one mile, as described in said report on pages 334 to 348 thereof, and carried into effect in the exhibits, as the cost per passenger per mile is so affected by density and volume of traffic that, due to the greater number of passenger miles in intrastate, as compared with interstate business, the cost per passenger per mile is and was of necessity less in intrastate than in interstate service.

Exception No. 43.

Operating Expenses at Stations, Division Between Intra and Inter State Passenger.

Exception is taken to the division, between intrastate and interstate passenger business, of the accounts No. 63—"Station Employees" and No. 66—"Station Supplies and Expenses" on the relative number of intrastate and interstate passengers, as described in said report on pages 348 et seq., thereof, and carried into effect in the exhibits, as such division should be on a ratio not more unfavorable

to intrastate passenger business than the ratio of the number of passengers carried one mile in each service.

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Exception No. 44.

Loss Due to Reduced Rates.

Exception is taken to the determinations and findings, and to the reasons expressed therefor on pages 250 et seq. of the report upon which the Master bases and allows an estimated loss due to, and claimed to be, the necessary result of putting into effect the rate of two cents per passenger per mile, the allowed loss being equal to the difference between the earnings under the rates now and heretofore in force, and the earnings on a flat rate of two cents per passenger per mile applied to the identical amount of business done in the years considered on the assumption that the probable earnings under the two cent rate would be that amount iess than under the previous rate, for the reasons severally and collectively, that:

(a) There is no proof and no presumption that there will be any

loss.
(b) There is no basis for a conclusion that increased traffic sufficient to recoup or equalize any loss in revenue per passenger mile due to the decreased rate, will not result therefrom.

(c) Said rate never having been put into operation on complainant's line, there is no experience and no basis on which to estimate

or to find any loss due to putting it into affect.

(d) There is no testimony or evidence that the decreased rate will not so increase the volume of traffic that there will be no loss of revenue.

(e) The presumption or the rule of experience that increased traffic produced by the decreased rate will be sufficient to overcome, in whole or in part, the loss in revenue per passenger per mile due to the decreased rates, has not been overcome.

(f) The conclusion, as set forth on pages 354 et seq. and 358 et seq. of said report, that the reduction of the passenger rate in 1907 from four to three cents, did not result in increased traffic is unsupported by the evidence being that increased business did result from such reduction.

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Exception No. 45.

Loss—Probable Earnings under Reduced Rate.

They except to the entire of the Master's discussion in such report, on pages 350 et seq., and to all findings and determinations based thereon, on the subject of the "probable earnings under the two cent rate" and insist that no reduction for a possible decrease in net revenue is permissible until after a test of experience furnished by putting the rates into effect after a reasonable time, and they except that there is no proof to sustain the Master's conclusions, findings or deductions on that subject.

Exception No. 46.

Values and Operating Expenses, Division Between Inter and Intra State Freight.

The defendants except to the said report in its determinations and findings, as declared on pages 366 et seq., thereof, as to the amounts of property, revenue and expenses attributable to complainant's freight business, and to the intrastate proportion thereof, as improper for the reasons, severally and collectively, that:

(a) An insufficient proportion of property and expenses is assigned to freight business, with the result that passenger business is thereby

unduly burdened.

(b) In the division of the property, and expenses allocated and assigned to the freight business, between intrastate and interstate freight services, an excess proportion is assigned to intrastate business.

(c) In the division of property and expenses between the intrastate and interstate freight business, the allowance of a greater amount of stational expense as attributable to intrastate business than is attributed to interstate business is improper and is founded on improper and insufficient evidence.

Exception No. 47.

Operating Expenses-Greater Stational Costs for Intrastate Freight.

They except to so much of the Master's report, found on pages 369 et seq. and to the findings and determinations based thereon, as is to the effect that there is a proven greater cost for stational service for intrastate than for interstate freight, and insist that the Master has disregarded the proofs in this respect, and they particularly except to the passages of the report thereon as hereinafter set forth.

"But the complainant claims that even if the haulage cost in the two services is the same per ton mile, nevertheless terminal and stational expenses cannot be properly divided on the relation of the freight ton miles made in the intra and inter state services, respectively, but should be divided in proportion to the tons handled in the

stations and terminals.

"It seems to me that in this contention complainant is correct. The cost of assembling and delivering freight in stations and terminals has no relation to the miles over which such freight is carried." (Pp. 369-370.)

"The total of these stational and terminal expenses thus determined aggregated in 1912 \$405,365, and in 1913 \$469,405." (P.

371.)

"It was shown by the undisputed testimony that the stational or terminal service performed in interchanging car-load freight with other carriers at junctions is much less per car than that performed in originating or delivering it at stations on the line of the road, and that on the average it was not more than one-fourth of the latter." (P.

"It is claimed by the defendants that the testimony upon which I base my findings as to the average stational service given a ton of freight in the interchange thereof with another railroad consists entirely of opinion testimony, and that opinion testimony does not furnish a sufficient basis for such a finding.

"The finding, however, is based only in part on opinion testimony as hereinafter explained, and such opinion testimony was not of the same character as that which was criticised in the Minnesota Rate Cases. The opinion evidence on this point in this case was from employees of the complainant thoroughly familiar with its method of interchanging freight, and of the amount of service required therein. It was shown further, undisputed in the case, that in general such interchange was made in loaded cars placed on delivery tracks conveniently arranged so that little expense was involved in either putting the car on to the exchange track or taking it therefrom.

"It was further shown that the complainant, in receiving freight at stations on its line, is compelled in general, first, to spot cars to be loaded, often at industries considerably distant from its main line, then, when the cars are loaded, haul the cars to its main line; and that in delivering freight, the service is the same with the process reversed.

"It was further shown in the evidence that at junction 355 points usually several cars at a time, amounting at some junctions to more than 500 cars a week, are interchanged, whereas in the delivery or receipt of freight at stations on the line, the deliveries are in fewer car lots, there being over 200 stations on the road in Michigan where freight is originated and delivered as against only twelve The fact that the junction points where freight is interchanged. interchange business involves less stational service than is involved in originating and delivering freight at stations is proved by undisputed evidence; the amount of this excess is shown only by opinion From this opinion evidence I find that the relative service on this interchange business does not exceed one-fourth of the service that is performed in originating or delivering freight at sta-The results of this division are as tions on the line of the road. (Pp. 374-375.) above shown."

They further except that the failure to set off and separate from the other business the shorthaul ore business, and its stational service, entirely destroys the value of the Master's separation of costs between inter and intra state freight business, and that if such service were included the cost of interstate freight service on complainant's line, as compared with the cost of the intrastate freight service, would be several times as much per unit.

Exception No. 48.

General, Rates of Return and Property.

The defendants except to the said report and to its determinations and findings as a whole, as erroneous and contrary to the evidence, as:

(a) The net revenue shown therein to be earned by and attributed to, the intrastate passenger business for each of the several years embraced in the report, are less than under all the evidence they should

have been found to be.

(b) The amounts of property and expenses attributed, assigned or allocated to the intrastate passenger business for each year comprehended in said report, are greater than under all the evidence, they should have been found to be.

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In Conclusion.

The several heads or sub-divisions of each separate exception are intended to operate both cumulatively and separately, and each separate sub-division is made tantamount to a separate exception. The reference to pages in the exceptions are not intended to be exclusive, but the exception is intended to comprehend within its language full exception to all matters and things, including the computations to carry any finding into effect, stated in the report or exhibits bearing upon the identical subject, without regard to whether it is included within the pages stated in the exception or not.

Wherefore these defendants respectfully submit that the report of the Master should be overruled, set aside and held for naught, and a decree entered sustaining the validity of the rate statute and dismissing the bill.

Dated February 19, 1917.

ROGER I. WYKES, Solicitor for Defendants.

Filed February 20, 1917. ELMER W. VOORHEIS, Clerk.

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18.

In the United States District Court, Eastern District of Michigan, Southern Division.

THE DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Complainant,

VS.

Grant Fellows, Cassius L. Glasgow, Lawton T. Hemans, Charles S. Cunningham, John R. Van Evera, Morgan W. Jopling and Fred S. Case, Defendants.

Complainant's Exceptions to Report of Special Master in Chancery Herein.

Comes now the Duluth, South Shore & Atlantic Railway Company, complainant herein, and excepts to the report of Herbert L. Baker, Special Master in Chancery herein, filed in this case on the first day of February, 1917, and for cause of exception, shows:

First. That said Special Master has in his report, in determining the value of complainant's property in the state of Michigan, used in its intra-state passenger business in Michigan, deducted from the real value of the complainant's real estate, shop buildings, shop tracks and shop machinery at Marquette, and complainant's round-house at Thomaston, and complainant's passenger station at Marquette, as found by him, the sum of \$45,593.00, upon the theory that the proportion of the real value of the said property represented by said sum, was devoted by complainant, to railroad business in Wisconsin; whereas the Master should have found that all of the real value of

said property as found by him, should be included in the valuation of the property of complainant, utilized by it in its 358 intrastate passenger business in Michigan. (Pp. 235-237 of

Report.) Second. That the Master in computing the value of complainant's property used in its intrastate passenger business in Michigan allowed for the item of taxes during construction, only the sum of \$100,000; whereas the amount which should have been allowed by him for that

item, is at least \$150,000. (Pp. 213-218 of Report.)

Third. That the Master, in computing his modified train mileage ratio, used for the division of common property and for the division of certain common expenses between the passenger and freight business, included all of the time spent by freight trains at stations as time in which switching movement by such trains were being made; whereas, the facts are as shown by the evidence, that a large part of the time of trains at such stations, amounting to at least 15% thereof, is spent by train crews in unloading less than car-load freight, waiting for orders, or waiting for leaving time; and that during such 15% of the time, no switching operations are carried on. of Report.)

Fourth. That the Master, in considering the result of the operations of complainant's railroad in Michigan, failed and refused to consider and include with the operating expenses of said railroad, any charge for the annual depreciation of bridges, trestles, culverts and other structures; whereas, he should have included with the operating expenses, the annual depreciation of said structures as shown by the evidence introduced in the case. (Pp. 271-275 of

Report.)
Fifth. That the Master, in computing the results of complainant's operations in Michigan in the year 1913, deducted from the operating expenses of such year, as shown by complainant's accounts, the sum of \$102,148.00, all of which sum had been actually expended

by complainant in said year in the state of Michigan, in the maintenance and up-keep of its railroad property; whereas 359 the said sum having been properly expended for said purpose should have been included in the operating expenses of complainant

for said year. (Pp. 278-280 of Report.)

Sixth. The Master found that the minimum rate of return to which the plaintiff is entitled under the constitutional guaranty, is 6.5%; whereas, he should have found such rate of return to be at least 8%. (P. 389 of Report.)

Seventh. That the Master, in fixing the value of compplainant's property in Michigan used in its intrastate passenger business, allowed for the item of appreciation of road-bed, only the sum of \$300,000; whereas, the evidence in the case showed that such appreciation

amounted to at least \$553,000. (Pp. 225-234 of Report.)

Eighth. That the Master, in finding the amount of taxes paid to the state of Michigan on the property of complainant located and used in its railroad operations in Michigan in the year 1913, deducted therefrom the sum of \$673.00, as representing the taxes on the Michigan property which was assigned by the Master to the business in Wisconsin, as shown in our first exception; whereas, he should have found the full amount of taxes paid by complainant on all its Michigan property without deductions. (Pp. 350 of Report.)

(Signed)
(Signed)

A. B. ELDREDGE, PIERCE BUTLER, Solicitors for Complainant.

W. D. McHUGH, JOHN E. TRACY, Of Counsel.

Filed February 26, 1917. ELMER W. VOORHEIS, Clerk.

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19.

In the District Court of the United States for the Eastern District of Michigan, Southern Division. In Equity.

In Equity.

No. 4117.

DULUTH, SOUTH SHORE AND ATLANTIC RAILWAY COMPANY, Plaintiff,

V8.

Cassius L. Glasgow et al., Defendants.

Opinion.

Prior to 1889, statutory rates of passenger fares in Michigan for railroads in plaintiff's class were three cents per mile in the Lower Peninsula and five cents per mile in the Upper Peninsula. 1 How. Stat. (1st Ed.) Section 3323. From 1889 to 1907, such rates of fares were respectively two and one-half cents and four cents per mile. 2 C. L. 1897, Section 6234. From 1907 to 1911, the rates were two and three cents per mile. Act No. 54 of Pub. Acts of 1907. In 1911, the State Legislature departed from what apparently had become the settled policy to permit a higher rate to be charged by railroads in the Northern Peninsula than in the Southern and

enacted the statute which is here attacked and which fixes a maximum passenger rate of two cents per mile for all roads of plaintiff's

class in Michigan. Act No. 276 of Pub. Acts of 1911.

Probably the adoption and long continuance of the former policy of allowing higher rates of passenger fares in Northern Michigan was induced, in a large measure, by the greater difficulties of trans-These difficulties portation which exist in that part of the state. result from many different causes, such as prolonged and severe winter seasons and other unfavorable climatic conditions, entire absence of large cities, long distances between small cities and villages, sparsity of population and paucity of manufacturing plants and commercial enterprises other than those connected with the mining industry, all directly tending to reduce railroad traffic of all kinds to a minimum. While courts may not inquire into the motives which actuate legislative bodies in the enactment of laws, such a sudden and complete reversal of legislative policy as the reduction of rates of fare fifty per cent within a period of four years and the placing of railroads surrounded by such adverse conditions upon a parity with others much move favorably situated, increases the chances of unintentional and inadvertent transgression of constitutional limitations in specific instances and emphasizes the necessity for the most careful consideration of the merits of a case like the present one.

In July, 1911, after the enactment of the statute here under consideration but before it went into effect, this suit was commenced against the then Attorney General of the State of Michigan, the members of the State Railroad Commission and certain private patrons of the railroad, to restrain its enforcement upon the alleged ground that, as applied to this plaintiff, the law was in violation of several provisions of the Federal Constitution and hence invalid. Many of the claims and contentions, put forth and urged by both parties during the earlier stages of this inexcusably prolonged litigation, have been settled by the decisions of the Supreme

Court and are now abandoned. The large and important question which still remains to be determined is whether the so-called Michigan Two Cent Passenger Fare Law, as applied to plaintiff's railway, is confiscatory and, therefore, in violation of the

"Due Process" clause of the Fourteenth Amendment.

When the bill was filed in this case, an application for an interlocutory injunction was made, and, pending the hearing upon such application, a restraining order was issued. For reasons which need not be stated, no complete hearing has been had and no decision has been made upon the application for a temporary injunction, but by consent, the original restraining order has been continued in force until the present time. Pursuant to stipulation and by order of court, the restraining order was conditioned that plaintiff should issue to each person buying Michigan intrastate passenger transportation a receipt or certificate by which it should bind itself to refund to the holder thereof the excess fare paid, if the validity of the statute finally should be sustained. The redemption of the rebate

receipts and the re-payment of excess fares were required to be secured, at first, by bond, and later, in addition to the bond, by the deposit of the moneys so received in designated banks subject to the order of the court. The fund so on deposit now amounts approximately to the sum of \$750,000.00, the disposition of which depends

upon the final outcome of this suit.

In May, 1912, the case was referred to a Special Master to take the proofs, to make the necessary computations, to find and state the facts and to report his findings and recommendations to the court. At intervals during a considerable period of time, very extensive proofs were taken, the testimony aside from many exhibits covering more than twelve thousand typewritten pages. The transactions and operations of plaintiff in the four fiscal years, 1910 to 1913, including its revenues, receipts, expenses and expenditures in each of those years, and also the condition and value of the property employed in each branch of its service, were inquired into and examined in minute detail. Elaborate schedules, tables and computations, based upon the theories and formulas of eminent engineers and expert accountants, were presented. Voluminous briefs were filed and lengthy oral arguments were had. Finally, on February 1, 1917, the Master filed a carefully prepared and well considered report covering more than 500 printed pages, and, in the main, sustaining the contentions of plaintiff. This report and the numerous objections and exceptions thereto are now a part of the present record

Inimediately upon the filing of the Master's report, this court, believing that a final decree directing the disposition of large sums of money, which have accrued since June 30, 1913, and vitally affecting the present and future operations of an extensive railroad system, ought not to be based upon proofs of conditions more than three and one-half years old, suggested and, in fact, insisted that the record should be brought down as nearly as possible to date by proofs taken in open Court and by a new hearing upon the proofs so taken. The suggested course of procedure met with the approval of counsel on both sides and was readily and willingly agreed to and adopted. New schedules, requiring the skilled labor of several experts and their assistants for several months, have been prepared, extensive tests have been made, and supplemental proofs have been taken in open court, covering plaintiff's railroad operations during the four

fiscal years of 1914 to 1917 inclusive. The later testimony
362 and investigations have developed important changes, not
only in the claims and theories advanced, but also in actual
conditions shown to exist. The ultimate decision of the case must
rest not alone upon the record made before the Master but also and,
more especially, upon the evidence produced and taken at the pres-

ent hearing.

This case presents all the difficult problems usually incident to rate cases as well as others of large importance not usually found in such cases. Each question, usual and unusual, which, in any way or degree, is controlling of, or has a material bearing upon, the final issue, must be separately considered and determined. To attempt

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to do more than to state the conclusions reached and, as briefly as possible, to outline the reasons for such conclusions, would prolong this opinion beyond any reasonable limits.

Estoppel.

At the threshold of the investigation, we are met with the contention of defendants that plaintiff is estopped from denying or questioning the constitutionality and validity of the rate statute here The somewhat shadowy basis of this contenunder consideration. tion is the fact that one or more of plaintiff's remote predece sors received from the United States and the State of Michigan grants of land in consideration for the original construction of some parts of the present line of railroad, and the claim that, in at least one instance, the grantee of such lands bound itself and its successors to abide by and to obey all laws of the state which thereafter might be A recital of the history of the origin and construction of the various parts and divisions of plaintiff's railroad and their consolidation into one system would be a long story. It is sufficient to say that a part of the northern division was built more than fifty years ago. Later, other parts were constructed at different times and by different companies. Plaintiff was incorporated in 1887 under the laws of this State authorizing a consolidation of railroad companies. Afterwards, plaintiff built connecting links and acquired by purchase other branches or divisions, thus forming and creating its present system. Some of the earlier corporations received land grants which, presumably, were fully Of the lands granted, plaintiff has received, either directly or indirectly, only about 82,000 acres. The other lands were disposed of, lost through foreclosure, or retained by the companies receiving them. Except possibly in one instance, no conditions here material were attached to any of the grants. One corporation built about twenty miles of railroad from Marquette to Ishpeming and, in connection therewith, received a grant of lands. One of the provisions of the statute authorizing such grant, accepted by the grantee, was that, "All of said railroad companies shall, at all times and in all matters, be subject to the laws of this state, and to such rules and regulations as may from time to time, be enacted and provided by the Legislature of the State of Michigan, in regard to the management and disposition of the said lands not inconsistent with the provisions of this act, and the Act of Congress making said grant Defendants build their entire structure of of land to this State." estopped upon this patently ambiguous provision of the statute of Assuming, however, that the statute above quoted was intended to apply to the operations of the railroad and not solely to the disposition of lands, it was merely declaratory of the law as it would have existed in the absence of legislative enactment. far cry from the little illy equipped railroad of half a century ago. through meny changes of title and ownership, to the present system nearly 500 miles in length, all of which, except twenty

miles, has been acquired from other sources and free from any

nch conditions. This ancient statute forms no part of the law unser which plaintiff was organized and, therefore, is not in any sense charter obligation. At this late day, it is impossible to read into the statute an intention of the Legislature to bind not only the rail-bad company then receiving the grant, but also all other companies which might, at any time, become associated or consolidated therewith, to observe and to obey every rate statute which thereafter might be enacted even though the enforcement thereof would necessarily esult in the confiscation of property. This contention cannot be ustained.

2. Western Division and South Line.

The so-called Western Division (Nestoria to the State Line) of claintiff's line was originally built as a connecting link and primarily of create a through interstate road. This part of the railroad runs brough a sparsely settled region and the local traffic thereon is condiderably less than that upon other divisions of the system. Here he interstate traffic exceeds the intrastate. However, the traffic of both kinds has continuously and substantially increased. Defendents claim that the loss, if any, in plaintiff's passenger business has occurred upon this division and contend that the operations thereon hould be segregated from the operations upon other divisions and he loss charged mostly, if not wholly, to interstate business. They urther claim that it was incumbent upon plaintiff to make such separation and, not having done so, it has failed to establish with sufficient certainty any right to relief.

The so-called South Line extends from Marquette to Negaunce

The so-called South Line extends from Marquette to Negaunee and Ishpeming and was originally built by an independent corporation as a competing road. In 1884, after it had been perated for about one year, one of plaintiff's predecessors curchased this line. Since then it has been used continuously for both interstate and intrastate passenger and freight traffic. Its use an connection with the main line provides substantially a double racked road between those cities. Defendants claim that the South-Line is unnecessary so far as intrastate traffic is concerned and contend that both the revenues derived therefrom and the expenses incurred thereon should be climinated from the computations in this

These contentions are effectually answered by the rate statute itself, which provides "That in computing the passenger earnings per mile of any company, the earnings and mileage of all branch roads owned, leased, controlled or occupied, or that may hereafter be owned, leased, controlled or occupied by such company, * * * shall be insulated in the computation, and the rate of fare shall be the same on all lines owned, leased, controlled or occupied by such company." Plainly, no division or branch, used for intrastate traffic, can be segregated from the other parts of the line or omitted from consideration in determining whether a statutory rate is confiscatory or sufficiently compensatory. The Legislature, in fixing the rate of passenger fares, has seen fit, at the same time and in the same statute, to require the

entire railroad line to be treated as a single unit. Under this statute, if the net income derived from plaintiff's intrastate passenger business as a whole is sufficient to yield a fair and reasonable return upon the value of the property employed in that service, it cannot recover, even though it may have suffered serious loss upon one or more divisions of its road. On the other hand, if the net income derived from

its intrastate passenger business upon its whole road in Michigan is insufficient to yield a fair and reasonable return upon the value of the property employed in that service, it is entitled to a decree, even though such business upon one or more of its divisions may have been profitable. Court decisions upon rate statutes containing no such provisions have little application and are not controlling here.

3. Mineral Range Railroad.

The Village of Houghton is the northern terminus of plaintiff's line of railroad. The Mineral Range Railroad Company owns, maintains and operates a line from Houghton to Calumet, a distance of fourteen miles. Calumet is the largest center of population in the Upper Peninsula of Michigan. The Mineral Range Company does not operate passenger trains between those places, but, under a contract between the two companies plaintiff runs its passenger trains to Calumet over the Mineral Range road and turns over to that company all the passenger fares earned upon its line. The distance from Marquette to Calumet is about 98 miles and, by apportioning to the Mineral Range Railroad 14/98ths of the train expenses from Marquette to Calumet, defendants reach the conclusion that about \$20,000 per year is the cost to plaintiff of the operation of its passenger trains north of Houghton. In fact, the actual extra expense is considerably less than such estimated amount, because enginemen and trainmen would receive nearly the same wages if their run terminated at The claim is that, in computing net income, this sum of about \$20,000 should be deducted from plaintiff's operating ex-This contention is untenable. Plaintiff's contract with the Mineral Range Railroad Company is in effect a lease of the right of way for passenger trains from Houghton to Calumet in con-sideration of the passenger fares collected upon that part of Plaintiff's purpose in making the contract was to secure traffic upon its own rails. If plaintiff had leased the right of way for the sum of \$20,000 and had collected and retained the passenger fares, no question could arise as to its right to include in its operating expenses the re-tal so paid.

Viewed from another standpoint, this expense is similar to that of advertising and of commissions to outside agents to obtain traffic. No question is raised as to the right to include such charges in operating expenses. Moreover, it appears from the record that plaintiff receives from the Chicago and Northwestern Railroad Company and the Chicago, Milwaukee and St. Paul Railway Company the sum of \$14,000 per annum, in addition to passenger fares, for hauling the trains of those companies over plaintiff's line to Houghton and thence

to Calumet. The main consideration for the payment of this money is to enable those companies to reach Calumet. In computing plaintiff's net income this sum of \$14,000 has been included in its earning...

4. Rate of Return.

The two cent rate has not been put into effect on plaintiff's railroad and no tests have been made to determine whether the resulting
reduction in fares would stimulate travel to such an extent as to offset the estimated loss. Under these circumstances, defendants insist
that, before plaintiff can be entitled to a decree in its favor, it must
have established conclusively not only that the statutory rate is not
compensatory, but also, that its enforcement will make impossible
any substantial return. This question seems to have been decided
by the Supreme Court against the claim of defendants in the recent

case of Rowland vs. Boyle, 244 U. S. 106-110.

365 To ascertain the loss in each year which would have resulted from the reduction of fares to two cents per mile, plaintiff has computed the amount of fares at two cents per mile for every mile of travel to which the rate could have applied and has sultracted that sum from the amount actually received under the three cent rate. It is certain that this method of computation is unfair to plaintiff, because, owing to competitive conditions, excursion rates, etc., if the two cent rate had been in force, plaintiff would not have received full two cents per mile for every passenger mile of travel. For example, in 1914, this railroad transported state troops about one million passenger miles at a statutory rate of one cent per mile. In its computations of loss, all of this travel has been included at two Again, in 1907, the State Legislature reduced the cents per mile. rate from four cents to three cents. Such reduction of rate did not stimulate travel to an appreciable extent. Hence, it is quite evident that industrial and commercial conditions, rather than rates, determine amount of travel. At all events, as said by the Supreme Court in the case above cited, "The direct effect of the reduction is plain—the remote one is at best a guess."

5. Sleeping, Dining and Chair Cars.

It is believed that, in this case, for the first time in the history of railroad rate litigation in this country, the surprising claim has been put forth that, in computing net income and rate of return, no part of the expense of hauling sleeping, dining and chair cars should be included in the passenger operating expenses of the railroad. This contention, which is urged with earnest insistence, involves the theoretical cutting of each passenger train into sections and charging to the sleeper and diner section a proportionate part, based upon weight, of all operating expenses, without crediting that section of the train with any part of the passenger fares collected. In their computations, defendants have charged to sleepers and diners a proportionate part of each operating expense account (except those in the "traffic" group) including such constant accounts

as superintendence, wages of trainmen and enginemen, maintenance of fences and crossings, and others of like character. The aggregate of these charges, averaging about \$175,000 per year, has been deducted from the passenger operating expenses and set aside and disregarded in obtaining the net income from passenger service. the last analysis, defendant's theory rests upon the assumption that the railroad company is not required by law to furnish sleeper and diner service and that there is, at all times, sufficient space in the day coaches for the accommodation of the traveling public. If this contention were sound, it is safe to say that no railroad of plaintiff's class in the State of Michigan could hope to win a rate case like the present one. But the contention is not sound. As early as 1875. railroads in Michigan were authorized by legislative enactment to use sleeping cars, parlor cars and chair cars for the transportation of passengers and to charge a reasonable compensation for such use in addition to the regular passenger fares allowed by law. 3 How. Stat. (2nd Ed.) Section 6696. That statute has been in force and acted upon for more than forty years. Every railroad of any considerable size in the state is furnishing such service. What formerly may have been a convenience has become a necessity. It is conceded that it would be poor business policy for any railroad to abandon the operation of these cars. In 1911, when the statute here under consideration was enacted, these conditions had long existed and it must be presumed that the Legislature had such conditions in mind and, in the absence of express declaration to that effect,

did not intend to limit, alter or overturn fixed and prevailing methods of railway travel and operation. Indeed, the statute itself empowers the railroad company "to regulate the time and manner in which passengers and property shall be transported" and thus, in express terms sanctions the use of all reasonable facilities for the transportation and convenience of the traveling public. No claim is made that the use of such cars is either unreasonable or unnecessary. It is also probably true that the State Railroad Commission, clothed as it is with broad powers, could compel this plaintiff to operate chair, sleeping and dining cars.

Referring once again to the statute here under consideration, we find that therein railroads are classified upon the bases of the gross earnings of passenger trains. No distinction is made between sleeping cars and day coaches. While this classification is not in any wise controlling of the exact question here presented, it is a recognition of the fact that the operation of these special cars is an integral part of the passenger service from which it cannot be divorced by fine spun theories unknown in actual experience and practice.

A subordinate claim of defendants is that, if the operation of sleeping, dining and chair cars cannot be wholly eliminated from consideration, at least the expense of hauling such cars should be divided between state and interstate business upon the basis of the interstate and intrastate passenger miles traveled therein instead of the interstate and intrastate passenger traffic upon the whole line. Elaborate schedules and tables have been prepared showing the number of interstate and intrastate passenger miles in sleeping cars upon

each division of the road. Upon one division the intrastate travel in such cars far exceeds the interstate, while the reverse is true upon the other divisions. This theory is equally untenable. The passenger train as a whole, with engine, baggage cars and all coaches, is a single unit provided for the transportation of interstate and intrastate passengers indiscriminately and alike. The train is run regardless of whether interstate or intrastate, or both interstate or intrastate, passengers are to be carried. Neither kind of traffic is incidental to or subordinate to the other.

6. Mail and Express.

Both parties have treated the carriage of mail and express as an independent branch of the passenger service. As in the case of diners and sleepers, defendants have divided each expense account upon the basis of the space occupied by and the weight of mail and express matter. Plaintiff has adopted a fixed percentage of the total operating expenses as the cost of such transportation. While the two methods are not directly related, the results reached are sub-With the exception of one year, the mail and stantially the same. express business has been profitable and has been a benefit rather than a burden upon the passenger business. In the computations, the results of which are hereinafter stated, this profit has been included in the passenger revenues, while the one year's loss has been disregarded and not deducted from such revenues. Either method of treating mail and express is too unfavorable to plaintiff. business is a mere incident to or by-product of the passenger service.

Neither mail nor express is handled by railroad employes. For the most part, they are carried in one end of the baggage car and add little or nothing to the general expenses. The extra wear upon the track and track structure is inconsequential and inappreciable. Constant expenses such as the wages of trainmen and enginemen and

the cost of the upkeep of fences, crossings, signals, stations, 367 etc., are not at all affected. If these constant charges had been left in the passenger accounts as they should have been, the profit arising from the transportation of mail and express upon this railroad would have been increased more than \$20,000.00 per year, and the net income from passenger traffic would have been correspondingly decreased, with a resultant substantial reduction in the final rate of return from intrastate passenger business. However, as before stated, this profit, whatever it may have been, has been credited, in this decision, to passenger revenue.

7. Values.

In view of the conclusions reached, the differences between the parties as to the value of plaintiff's railroad property become quite immaterial and need not be discussed except in a most general way. In ascertaining the values of both fixed property and equipment, plaintiff has adopted and used the theory of cost of reproduction

new, less depreciation. This method has received the approval of many courts and, perhaps, is the best yet devised for measuring the values of railroad property and industrial plants which are not bought and sold in open market and which may be said to have no market value in the sense in which that term is usually employed. Yet the adoption of this method to the exclusion of all other factors is both unsatisfactory and unsafe. One railroad property may be much more valuable than another, even though the cost of the reproduction of each may be the same. Some railroads are worth much more and others much less than the actual cost of replacing them. For example, it may well be doubted that, if plaintiff's railroad were now being constructed new, two lines would be built paralleling each other from Marquette to Ishpeming, or that the Western Division would be placed in its exact present location. Industrial activities and density of population and traffic are important elements which cannot be ignored in reckoning values of railroad property.

Some of plaintiff's claims as to values must be wholly rejected. In any plan for the actual construction of a railroad and in the preliminary estimates of its cost, an allowance for unforeseen contingencies may be proper, but, in determining whether a given rate is confiscatory, indulgence in speculation as to what may or may not happen cannot be permitted. The claim for application of roadbed is quite uncertain and speculative. Undoubtedly, a well maintained roadbed increases in efficiency and value with age. The older it becomes the less is the cost of its repairs and upkeep. But, in a case of this kind, an allowance for such appreciation must be supported by positive proofs which measure the value thereof in The reproduction cost theory also includes a terms of money. theoretical charge for "Engineering on Equipment." In this day and age, locomotives, cars, both passenger and freight, and all equipment are standardized and the prices thereof can be readily ascertained without the assistance of engineers. In any event, this engineering cost, if any, is included in the price paid and, in this case, is fully represented in the estimates of both parties.

On the other hand, whether values be measured by constantly increasing unit prices, prevailing from year to year, or "normal" unit prices of several years ago, the estimates and appraisals prepared and presented by defendants are in many respects much too low:

Lands.—A great volume of testimony by many witnesses has been taken on the question of the value of the right of way and station grounds of this railroad. In the main, defendants have adopted the lowest values placed thereon by any of the wit-

368 nesses. The Master, who saw and heard the witnesses, fixed the value of these lands, in 1913, at the sum of \$1,780,222.00. Defendants contend that the actual value is upwards of \$600,000.00 less than that sum. Without going into details and disregarding all claimed extra values arising from unused shore rights, rights of way in streets, rights of surface support through mineral lands, locations peculiarly adapted to and suitable for railroad purposes,

and added increments for platting into lots and streets, it is certain

that defendants' estimate is at least \$400,000.00 too small.

Grading and Track Laying and Surfacing.—These items have also been the subjects of much discussion and controversy. Defendants claim values nearly \$600,000 less than those found by the Master. In respect to grading, the difference consists largely in the different unit prices adopted, and, in respect to track laying and surfacing, in the diverse claims as to what is included therein and as to what methods should be employed. A careful examination of the evidence leads to the conclusion that the Master's findings are fully and fairly sustained. Defendants' estimates should be increased to the sum stated in his report.

Ties.—Defendants' valuation of ties is less than the price actually paid by plaintiff during the last four years. Their estimate upon

this item should be substantially increased.

Working Capital.—Defendants have not allowed anything for working capital although the record shows that plaintiff has had on hand upwards of \$100,000 for use in its current business. Working capital is necessary to the successful operation of any railroad and, when actually possessed, should be included in the appraised value of its property.

Defendants' estimates upon other items of both fixed property and equipment should be increased. If it were necessary, in the decision of this case, to determine accurately the value of plaintiff's property used in its railroad business, defendants' claimed values

would have to be increased more than one million dollars.

8. Factors, Ratios and Divisions.

This case is not an exception to the general rule in rate cases that the greatest difficulties are encountered in attempted divisions of common property and expenses, not capable of direct allocation, between passenger and freight business. In the main, but with some exceptions, both parties agree that the final division of common passenger property and expenses between state and interstate business shall be upon the basis of the number of passenger miles of transportation in each class of traffic. Plaintiff rightly contends that the cost per mile of intrastate passenger transportation is more than that of interstate, but concedes the practical impossibility of proving definitely and accurately the amount of such extra cost.

In the division of common property and expense, (particularly the right of way, station buildings and grounds and track structure schedules and expense accounts in the "maintenance of way and structures" group) three radically different factors or ratios have been applied and used, and a fourth has been suggested for possible application by the court, if the others shall be rejected. Plaintiff has adopted and advocates the so-called Modified Revenue Train Mile method of division. By this method, unallocated property and expenses are divided between passenger and freight service upon the basis of the number of revenue train miles (including, or medi-

fied by, switching movements upon common tracks) made in each service. Here the revenue train is the common unit 369 for all purposes of comparison. Differences in character of service performed and results accomplished are not recognized. Weight of the train and its load and varying degrees of perfection and efficiency of equipment are wholly disregarded. To the comparatively short and light passenger train is attributed the same use and the same upkeep cost of the track structure as to the long and It is urged with much insistence that these heavy freight train. differences are leveled by the greater perfection and efficiency of equipment and roadbed and track structure required for the higher speed of the passenger train and for the protection, comfort and safety of passengers. There is much to be said in favor of the employment of this basis of division, and, upon the whole record, as against those advanced by defendants, its use is supported and sustained by the greater weight of the evidence. But a careful review of the whole situation, including the number of trains moved, the number, size and character of the engines, cars and other equipment employed, the number of employes, the wages paid and the volume of traffic in each service, leads at least to serious doubt whether the employment of the Modified Revenue Train Mile method does not accord and assign somewhat too great a proportion of the common property and common expense to the passenger business.

allocated common property and expense, the preferred and primary one being what is termed the Gross Ton Mile ratio. Here one ton one mile is the common unit for all purposes of comparison. Weight and distances are the sole elements considered. All others are disregarded. Assuming, as defendants contend, that wear and strain upon the track structures are not increased by the higher speed of passenger trains, and, further, that plaintiff's roadbed and superstructure are not maintained at a higher degree of perfection and efficiency than is required for the freight traffic thereon, still two vital defects in the Gross Ton Mile theory are plainly evident. The first is that. in measuring use and expense, the carriage of a ton of human beings is treated exactly like the carriage of a ton of coal or iron ore. The second is the fallacy that, the more defective and ineffcient the tools and equipment, the greater the use of the property to and upon which they are applied. Passengers are not transported by weight and the more perfect and efficient the tools and equipment the larger their use and the use of that to which they are applied. In the transportation of passengers and freight, no comparable common ton unit exists. Wear is not always a true measure of use. The greater wear and strain caused by the flat wheels of a box car do not indicate a larger use of the steel rails of the track, but the exact reverse. regards the division of common expense accounts, this method ignores all causes of cost of upkeep other than wear and strain. In

fact, the larger proportion of the expense of the maintenance of way and structures is caused by weather or action of the elements. Ties, ballast, grading, ditches, bridges and even rails, deteriorate and must be repaired and replaced whether they are used or not used for

Defendants have proposed two methods or bases of division of un-

train operations. The life of a tie is not much longer when in use than when not in use. Any theory which wholly disregards such important elements of expense must be rejected.

The other and secondary method of division proposed by defendants is called the Time Ratio. This factor has been used in dividing property values of right of way, track structures, telegraph

and telephone lines and station buildings and fixtures, and also in dividing a few expense accounts, such as maintenance of bridges, trestles and culverts, grade crossings, fences, cattle guards and signs and removal of snow and ice. Here time of train movement is the unit used for all purposes of comparison. Distance, weight and kind are entirely ignored. Of this method it is sufficient to say that neither passengers nor freight are transported upon the basis of the time consumed in their travel. A passenger pays a fixed amount per mile of travel regardless of the time required for his journey. Likewise a ton or a carload of freight. In a strict and accurate sense, the entire railroad property is at all times jointly used and employed in both freight and passenger service. Hence the time of movement of a particular train, or of all trains, bears no relation, direct or indirect, to the use of the property as a whole.

The basis of division suggested by plaintiff, in case the ratio proposed by itself, for any reason, should be rejected, is the one adopted, after careful consideration of many others, by the Interstate Commerce Commission in the Western Passenger Fares Case, 37 I. C. C. Rep. 1-22-23, where it was said: "The fuel consumed by road locomotives drawing trains over the road; the lubricants, water, and other supplies for these locomotives; the train supplies; the wages of trainmen and enginemen, are all separated between passenger and freight, and each by itself or the aggregate of all will constitute an index of the utilization of the tracks by these two branches of the In the Arkansas Rate Case (Rowland vs. Boyle, 244 service." U. S. 106), this method of division was referred to, if not with approval, certainly without criticism, by the Supreme Court. It gives to freight a considerably larger and to passenger a correspondingly smaller percentage of property and expense than is done by plaintiff's assignment, and thereby dissolves and removes whatever doubt may have existed as to the correctness of the ultimate results reached by the application of the Revenue Train Mile ratio.

The percentages by this method of assignment to passenger service, compared with the percentages used by the Master for the years 1912 and 1913, and by plaintiff, for the four year period from 1914 to 1917 inclusive, are as follows:

Year.											1	. C. C. ratio.	Modified revenue train-mile ratio.
1912	 											36.24%	42.36%
1913												34.80%	41.91%
1914										٠		37.62%	45.09%
1915												41.21%	48.65%
1916				 					٠			37.36%	44.63%
1917				 								33.93%	42 21%

At the request and under the direction and supervision of the Court, expert accountants, (one from each side by agreement) have made careful, accurate and detailed computations in which the lesser percentages above stated have been applied, first, to defendants' lowest common property values, wherever time or gross weight percentages have been employed, and, second, to the common operating expense accounts, wherever the modified revenue train mile percentage had been employed, and also to the unallocated portions of the transportation expense accounts: Dispatching Trains, Station Employes and Station Supplies. The necessary changes have been made in all overhead accounts. Defendants' estimates of the values of the rail-

road property have been accepted. There is no dispute concerning the revenue or the totals of operating expenses. 371 difference between the parties in the divisions of the expense accounts, not separated, according to the new and substituted percentages, are too small materially to affect the results and, hence, plaintiff's divisions of these remaining accounts have been accepted. Taxes have been apportioned to passenger and freight upon the basis of the total value of property in each service. The profits derived from mail and express business have been included in the passenger revenues, while the loss incurred in one year has been excluded. The total passenger property has been divided between interstate and intrastate business upon the basis of the passenger miles of The estimated loss which would transportation in each service. have resulted from the application of the two cent rate to plaintiff's passenger business, computed in the manner hereinbefore stated, has been deducted from the net income under the three cent rate. final net results of these computations for the six years, 1912 to 1917 inclusive, are as follows:

1912.	Total.	Intra.	Inter.
Value of Passenger Property Net Income under Two-cent Rate	\$2,882,375 100,875	\$1,834,055 78,609	\$1,048,320 22,266
Rate of Return	3.500%	4.286%	2.124%
1913.	Total.	Intra.	Inter.
Value of Passenger Property Net Income under Two-cent Rate	\$2,793,523 72,892	\$1,831,992 55,339	\$961,531 17,553 1.83%
Rate of Return	2.61%	3.02%	
1914.	Total.	Intra.	Inter.
Value of Passenger Property Net Income under Two-cent Rate	\$3,081,623 91,191	\$1,993,453 61,808	\$1,088,095 29.383 2.70%
Rate of Return	2.96%	3.10%	
1915.	Total.	Intra.	Inter.
Value of Passenger Property Net Income under Two-cent Rate	\$3,327,343 Loss 8,007	\$2,338,789 Loss 5,527	\$988,554 Loss 2,480
Rate of Return	0.0%	0.0%	0.0%

1916.	Total.	Intra.	Inter.
Value of Passenger Property Net Income under Two-cent Rate	\$3,073,670 42,219	\$2,176,466 25,832	\$897,204 16,387
Rate of Return	1.37%	1.19%	1.83%
1917.	Total.	Intra.	Inter.
Value of Passenger Property Net Income under Two-cent Rate	\$2,889,648 37,957	\$2,042,114 20,023	\$847,534 17,934
Rate of Return	1.31%	.98%	2.12%
372 Averages for Six Ye	ears, 1912 to	1917.	
	Total.	Intra.	Inter.
Net Income under Two-cent Rate	\$3,009,685 56,188	\$2,037,812 39,347	\$971,873 16,841
Rate of Return	1.87%	1.93%	1.73%
Averages for Four Y	ears, 1914 to	1917.	
	Total.	Intra.	Inter.
Value of Passenger Property Net Income under Two-cent Rate	\$3,093,052 40,840	\$2,137,705 25,534	\$955,347 15,306
Rate of Return	1.32%	1.20%	1.60%

It is apparent that, if, in the foregoing computations, actual and fair values of property, instead of defendants' lowest estimates, had been used, and mail and express transportation had been treated as a by-product and credited with its own profits, (as strict accuracy required) the results would have shown a rate of return in intrastate passenger business of no more than 2 per cent during the first three

years and a loss in each of the last three years.

For the purpose of further comparison and demonstration, but with some patent inconsistency, another ratio has been obtained by adding to the road accounts used by the Interstate Commerce Commission the corresponding yard expense accounts of the fuel consumed by yard Locomotives: the lubricants, water and other supplies for these locomotives; the yard supplies; and the wages of yard conductors, brakemen and enginemen. These yard accounts are nearly all freight expense and consequently their addition to the road accounts further reduce the percentages of passenger property and expense assignment. The percentages so obtained are 31.17% for 1912; 30.42% for 1913; 33.00% for 1914; 36.17% for 1915; 31.95% for 1916; and 29.35% for 1917. The substitution of these reduced percentages and their application, in the manner above stated, yield the following results:

1912.	Total.	Intra.	Inter.
Value of Passenger Property Net Income under Two-cent Rate	\$2,569,461 131,893	\$1,634,948 99,152	\$ 934,513 32,741
Rate of Return	5.133%	6.065%	3.504%
1913.	Total.	Intra.	Inter.
Value of Passenger Property Net Income under Two-cent Rate	\$2,523,159 105,107	\$1,654,688 77,204	\$868,471 27,903
Rate of Return	4.17%	4.67%	3.21%
1914.	Total.	Intra.	Inter.
Value of Passenger Property Net Income under Two-cent Rate	\$2,788,674 128,435	\$1,803,993 86,685	\$984,681 41,750
Rate of Return	4.61%	4.81%	4.24%
373	Total.	Intra.	Inter.
Value of Passenger Property Net Income under Two-cent Rate		\$2,113,160 17,513	\$893,185 6,256
Rate of Return	.79%	.81%	.70%
1916.	Total.	Intra.	Inter.
Value of Pasenger Property Net Income under Two-cent Rate	\$2,727,368 76,437	\$1,931,249 50,807	\$796,119 25,630
Rate of Return	2.80%	2.63%	3.22%
1917.	Total.	Intra.	Inter.
Value of Passenger Property Net Income under Two-cent Rate	\$2,589,175 62,672	\$1,829,770 38,243	\$759,405 24,429
Rate of Return	2.42%	2.10%	3.22%
Averages for Six Ye	ears, 1912 to	1917.	
	Total.	Intra.	Inter.
Value of Passenger Property Net Income under Two-cent Rate	\$2,700,697 88,052	\$1,827,968 61,601	\$872,729 26,451
Rate of Return	3.26%	3.37%	3.20%
Averages for Four You	ears, 1914 to	1917.	
	Total.	Intra.	Inter.
Value of Passenger Property Net Income under Two-cent Rate	\$2,777,890 72,828	\$1,919,543 48,312	\$858,347 24,516
Rate of Return	2.62%	2.52%	2.86%

These figures demonstrate conclusively that, upon any reasonable hypothesis, during the last six years, and particularly during the more important period of the last four years, plaintiff would not

have received, under a two cent rate, an adequate return from its intrastate passenger business. This conclusion accords with and is confirmed by many known facts. The passenger travel upon this railroad is comparatively light and very much less than that upon roads of the same class traversing sparsely settled portions of the Lower Peninsula of Michigan. Climatic conditions are extremely unfavorable. No large cities are served, either along the line of road or at terminals. Distances between even small centers of population Agricultural development is small. The situation and conditions shown by this record are quite similar to those of the Minneapolis and St. Louis Railroad Company, described in the Minnesota Rate Cases, where the Supreme Court, notwithstanding erroneous methods of computation and apportionment, declared the statutory rate to be confiscatory. In the Arkansas Rate Case, where the rate of return was little, if any, larger than here, the same Court sustained the contentions of the railroad company. It is settled by experience and by authority that the cost per mile of the transportation of the intrastate passenger is more than that of the inter-

374-5 state, and yet, in the Western Passenger Fares Case, the Interstate Commerce Commission granted to this plaintiff, and to other railroads much more favorably situated, the right to charge two and four tenths cents per mile for interstate transportation. Plaintiff has never paid a dividend upon its stock and, from its income, has never been able to pay more than a small portion of the interest upon its bonded indebtedness. There is no charge of mismanagement in recent years. Operating expenses have steadily increased and

are likely to continue to increase for some time to come.

Plaintiff is entitled to a decree in its favor. The precise form thereof will be settled after hearing counsel for both parties. At the time of the settlement of the decree, the effect of the recent action of the Government in taking over the control and operation of the railroads of the country, including this one, upon the extent and scope of the relief by injunction which should be granted, will be considered and determined.

C. W. SESSIONS, District Judge, Sitting by Designation.

Dated, January 8, 1918.

Filed in Clerk's office, January 9, 1918. ELMER W. VOORHEIS, Clerk. 376 20.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Plaintiff,

VS.

Cassius L. Glasgow, Charles S. Cunningham, Addison A. Keiser, Alex. J. Groesbeck, Morgan W. Jopling, John R. Van Evera, and Fred S. Case, Defendants.

Final Decree.

It appearing to the Court that the report of Herbert L. Baker, Esq., Special Master heretofore appointed herein, which was filed on February 1st, 1917, was based upon testimony which related to the valuation of plaintiff's property used in its passenger business in the State of Michigan, and the results of the operations of the Plaintiff Company's business solely for the fiscal years 1910, 1911, 1912, and 1913, ending June 30th of each year, the Court held the same insufficient as a basis for an adjudication of all the issues involved in this case, for the reason that to properly adjudicate the issues herein, it was necessary that testimony covering the valuation of said property and the operations of the plaintiff company during the fiscal years which had intervened between 1913 and the final hearing, should be presented and considered by the Court.

The Court thereupon directed the parties to prepare and present testimony covering the valuation of said property and the operations of the plaintiff company during such intervening fiscal years,

and directed that the same should be presented in open Court.

Thereafter, in accordance with such direction, testimony of respective parties covering the valuation of said property and the results of the operations of the company during said intervening fiscal years, to-wit: 1914, 1915, 1916, 1917, was presented to the Court. And the case was submitted to the Court upon the testimony introduced before the Master, and by him returned to the Court, together with the testimony introduced in open Court as aforesaid, and the argu-

ments of Counsel. And the Court having considered the same, It is thereupon ordered, adjudged and decreed as follows:

1. That the Act of the Legislature of the State of Michigan complained of in this suit, being Act Number 276 of the Public Acts of the State of Michigan for the year 1911, was, at the time when it was enacted and approved, and became effective so far as the same affected the plaintiff company, repugnant to, and violative of the Constitution of the United States, forasmuch as by the provisions thereof, the plaintiff railway company could not exact for the transportation of passengers from one point to another within the State of Michigan, charges which would yield to said company reasonable compensation for such services. That ever since the said act became effective, the said act has been and now is, so far as it relates to the plaintiff company, repugnant to, and violative of the Constitution of the United States, forasmuch as by the provisions of said act, the said plaintiff

railway company could not exact for the transportation of pas-378 sengers from one point to another within the State of Michigan, charges which would yield to said company reasonable compensation for such services; and the said act so far as it relates to the plaintiff company, was, at the time it became effective and ever

since has been and now is void and of no force.

2. That the said Cassius L. Glasgow, Charles S. Cunninghom, and Addison A. Keiser, constituting the Railroad Commission of the State of Michigan and their successors in office, be and each of them is hereby permanently enjoined and restrained from taking any steps or instituting any proceedings for the enforcement of the said act against said plaintiff company or its officers or representatives, and from entertaining, hearing or determining any complaint against the plaintiff company for or on account of any act or thing by it, its officers, servants, agents, or employees done, suffered or omitted, which may be forbidden or commanded by said legislative act; and from instituting or prosecuting or causing to be instituted or prosecuted any action or proceeding, civil or criminal against the plaintiff company or its officers or representatives, for any act or thing done, suffered or omitted, which may be forbidden or commanded by said act; and said defendant Alex, J. Groesbeck, Attorney General of the State of Michigan be and he hereby is in like manner enjoined from bringing or causing to be brought or prosecuted, any proceeding by way of injunction, mandamus, civil action or indictment against said company or its officers, on account of any action or omission on the part of the plaintiff company commanded or forbidden by the said legislative

379 3. That the said defendants Morgan W. Jopling, John R. Van Evera and Fred S. Case, and all other persons making use of plaintiff's line of railway, be and they are and each of them hereby is permanently enjoined and restrained from instituting or causing to be instituted any action or proceeding to collect from plaintiff company, damages or penalties for any violation by the plaintiff company

of the said act.

4. That neither party recover costs herein.

5. It is further ordered that the order of this court, dated the 26th day of September, 1911, requiring the plaintiff, during the pendency of this suit, to issue to all persons travelling intrastate on its road, refund coupons agreeing to refund to the holder of the same an amount equal to the difference between the rate of fare charged such passenger for transportation and the rate prescribed in the act complained of, is hereby set aside and annulled and said coupons are adjudged to be of no validity or value, and the bond provided to be given and given by said plaintiff for the redemption of said coupons is hereby discharged; and the order heretofore entered on the 22nd day of October, 1915, directing the plaintiff to set aside a special bank deposit for the redemption of said coupons is also set aside and annulled, and the banks in which deposits of funds have been made by the plaintiff in accordance with said order are hereby ordered to pay over to the plaintiff at its request all sums of money deposited by the plaintiff in said banks, or the securities representing the same, if any of the said

moneys have been invested under the orders of this court, and all said moneys and the securities representing the same, if invested, are hereby freed from any trust imposed upon them by said order

Provided, however, in order that the rights of all parties may be protected and the status quo preserved during a review of this cause upon appeal, if such appeal is desired, the operation of this section (section 5) of this decree is hereby suspended for a period of twenty days from the date of entry hereof to permit an appeal by the defendants, and if such appeal is within said time duly allowed, such operation of said section is further suspended for and during the pendency of such appeal until the final determination thereof, during which time said orders shall continue in full force, except as herein modified. And it is decreed that if defendants appeal herein as hereinabove mentioned, then pending the determination of this case upon such appeal the plaintiff shall comply with said order to the extent of issuing and delivering coupons as therein provided; but from the date hereof plaintiff will not be required to make any special or other deposit for the redemption of said coupons. But the bond heretofore given under said order and the special deposits heretofore made under said order shall stand as security as well for the redemption of the coupons heretofore issued under said order, as the coupons which

may hereafter be issued as hereinabove provided.

6. It is further ordered, adjudged and decreed that the defendants berein, members of the Railroad Commission of the State of Michigan, or the Attorney General may hereafter, when the circumstances have changed so that the rates fixed in the said act shall yield to the

said plaintiff company reasonable compensation for the services aforesaid, apply to this Court by supplemental bill or otherwise, as they may be advised, for a further order in that behalf.

7. Provided further, that nothing herein contained shall in any manner be construed as in any manner affecting or as a limitation upon or interference with the control, regulation, or fixing of rates for said railroad by the Federal Government or any agency thereof.

Dated this 13th day of February, 1918.
Approved for entry:
C. W. SESSIONS,

District Judge, Sitting by Designation.
Filed Febr. 14, 1918

Filed Feby. 14, 1918. ELMER W. VOORHEIS, Clerk.

382 DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Plaintiff,

VS.

Cassius L. Glasgow, Charles S. Cunningham, Addison A. Keiser, Alex. J. Groesbeck, Morgan W. Jopling, John R. Van Evera, and Fred S. Case, Defendants.

The matter of application for allowance of Master's compensation in the above entitled matter having come on to be heard, the Court

hereby fixes such compensation at \$14,000; one-half of any balance yet remaining unpaid to be paid by each party respectively. And that the defendants pay in addition \$25.40 expenses incurred by the Master in traveling to take testimony of witnesses produced by the defendants at Chicago.

Dated this 13th day of February, 1918.

C. W. SESSIONS, District Judge, Sitting by Designation.

Filed Feb. 14, '18. ELMER W. VOORHEIS, Clerk.

383 Duluth, South Shore & Atlantic Railway Company, Plaintiff,

VS.

Cassius L. Glasgow, Charles S. Cunningham, Addison A. Keiser, Alex. J. Groesbeck, Morgan W. Jopling, John R. Van Evera, and Fred S. Case, Defendants.

It appearing to the Court that Lawton T. Hemans one of the defendants and member of the Michigan Railroad Commission is deceased and that Addison A. Keiser of Ludington, Michigan has succeeded said Hemans as a member of said Railroad Commission; and it also appearing that the defendant Grant Fellows has been succeeded in the office of Attorney General for the State of Michigan by Alex J. Groesbeck of Detroit, Michigan; now, therefore, by agreement of the parties had in open Court it is ordered that the said Addison A. Keiser as a member of said Michigan Railroad Commission and Alex J. Groesbeck as Attorney General of the State of Michigan, be and they are hereby substituted as defendants in the above cause in place of said Lawton T. Hemans, deceased, and Grant Fellows as attorney general; and the said substituted defendants having entered their respective appearances in this cause as defendants, through their solicitor Alex J. Groesbeck, Attorney General of the State of Michigan, it is further ordered, by consent of the parties, that the pleadings heretofore filed in the above entitled cause for and on be-

ings heretofore filed in the above entitled cause for and on behalf of the defendants, stand as the pleadings for the said substituted defendants.

Dated this 13th day of February, 1918.

C. W. SESSIONS, District Judge, Sitting by Designation.

Feby. 14, '18. ELMER W. VOORHEIS, Clerk. 385

21. Petition for and Allowance of Appeal and Assignment of Errors.

United States District Court, Eastern District of Michigan, Southern Division. In Equity.

Former C. C. Case 4117.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Plaintiff and Appellee.

ALEX, J. GROESBECK, CASSIUS L. GLASGOW, CHARLES S. CUNNINGHAM, Addison A. Keiser, Morgan W. Jopling, John R. Van Evera, and Fred S. Case, Defendants and Appellants.

On this 5th day of March, 1918, at 11 o'clock A. M. the above named defendants, Alex J. Groesbeck, Cassius L. Glasgow, Charles S. Cunningham and Addison A. Keiser, presented to the Court in open session a petition asking for the allowance of an appeal to the Supreme Court of the United States from the final judgment and decree entered in said action in this Court on the 13th day of February, 1918, and a severance of the other defendants and permission to appeal without joining such other defendants.

It was made to appear that notices of the presentation of this application, at this time and place, had been duly served upon all the other defendants, namely, Morgan W. Jopling, John R. Van Evera and Fred S. Case. Roger I. Wykes appeared as counsel for the petitioning defendants, and none of the other parties plaintiff or defendant

appeared.

Upon reading and filing the said petition for appeal, it is ordered that said appeal be, and the same is hereby permitted to the parties requesting the same, without the other defendants joining, and the said appeal is hereby allowed to the said defendants Groesbeck, Glasgow, Cunningham and Keiser as prayed in said petition, without the giving of bond, the giving of a bond having been waived by plaintiff in open court.

C. W. SESSIONS, District Judge, Sitting by Designation. 386 United States District Court, Eastern District of Michigan, Southern Division. In Equity.

Former C. C. Case 4117.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Plaintiff and Appellee,

VS.

ALEX. J. GROESBECK, CASSIUS L. GLASGOW, CHARLES S. CUNNING-HAM, Addison A. Keiser, Morgan W. Jopling, John R. Van Evera, and Fred S. Case, Defendants and Appellants.

Now come the above-named defendants, Alex. J. Groesbeck, Cassius L. Glasgow, Charles S. Cunningham and Addison A. Keiser, who feeling aggreived by the decree rendered and entered in the above entitled cause on the 13th day of February, 1918, desire to

appeal therefrom.

These defendants show that they heretofore demanded of the other defendants (Mr. Morgan W. Jolping, John Van Evera, and Fred S. Case) named in said cause, that they join in this appeal, and duly notified each of said other defendants of the time and place where this petition would be presented, as more fully appears from the original notice and proof of service thereof, which are hereto attached and herewith presented to and filed in this Court.

Therefore, these defendants hereby appeal from the said decree to the Supreme Court of the United States for the reasons set forth in the Assignment of Errors, filed herewith, and they pray (a) that this appeal by them, separately from and without other defendants joining therein, be allowed, (b) that citation be issued as provided by law, (c) and that a transcript of the records, proceedings and documents upon which said decree is based, duly authenticated, le

sent to the Supreme Court of the United States, sitting at Washington, D. C., under and in accordance with the statutes and the rules of such Court in such case made and provided.

ALEX. J. GROESBECK, CHARLES S. CUNNINGHAM, CASSIUS L. GLASGOW, ADDISON A. KEISER, By ALEX. J. GROESBECK,

Attorney General.

LELAND W. CARR, ROGER I. WYKES,

Attorneys for Defendants and Appellants.

Dated this 1st day of March, 1918.

Filed March 6th, 1918. ELMER W. VOORHEIS, Clerk. 388 United States District Court, Eastern District of Michigan, Southern Division. In Equity.

Former C. C. Case 4117.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Plaintiff and Appellee,

V8.

ALEX. J. GROESBECK, CASSIUS L. GLASGOW, CHARLES S. CUNNING-HAM, Addison A. Keiser, Morgan W. Jopling, John R. Van Evera, and Fred S. Case, Defendants and Appellants.

To Morgan W. Jopling, John R. Van Evera, and Fred S. Case:

You, and each of you, being named as defendants in the above entitled cause, are hereby notified that we, Alex. J. Groesbeck, Cassius L. Glasgow, Charles S. Cunningham and Addison A. Keiser, who are also defendants therein, propose to appeal to the Supreme Court of the United States from the judgment and decree of the above-named District Court entered therein on February 13, 1918, and that we will, on the 5th day of March, 1918, at 11 o'clock A. M., present to the Hon. Clarence W. Sessions, District Judge, at the District Court room in the Federal Building in the City of Grand Rapids, Michigan, our petition to have said appeal allowed.

And the above-named Alex. J. Groesbeck, Cassius L. Glasgow, Charles S. Cunningham and Addison A. Keiser, hereby request and demand that you, and each of you, join with them in the taking

of said appeal to the Supreme Court.

Very respectfully.

ALEX. J. GROESBECK, CASSIUS L. GLASGOW, CHARLES S. CUNNINGHAM, ADDISON A. KEISER, By ALEX J. GROESBECK & ROGER I. WYKES,

Their Attorneys.

389 I hereby acknowledge due and timely service of the within notice on March 1st, 1918.

(Signed) JOHN R. VAN EVERA.

390 STATE OF MICHIGAN, County of Marquette, 88:

Moritz H. Fahlstedt, being duly sworn, deposes and says that he served a true copy of the within notice upon Fred S. Case, by hand-

ing a copy of the same to him personally, in the City of Sault Ste.

Marie, on the 1st day of March, 1918.

(Signed) MAURITZ H. FAHLSTEDT.

[SEAL.] (Signed) G. A. CARLSON,

Notary Public,

Marquette County, Michigan.

My Commission expires April 17th, 1920.

STATE OF MICHIGAN, County of Marquette, 88:

Mrs. Mauritz H. Fahlstedt, being duly sworn, deposes and says that -he served a true copy of the within notice upon John R. Van Evera, by handing a copy of the same to him personally, in the City of Marquette, on the 1st day of March, 1918.

(Signed) MRS. MAURITZ H. FAHLSTEDT.

[SEAL.] (Signed) J. F. HORNGREEN,

Notary Public,

Marquette County, Michigan.

My Commission expires August 6, 1919.

STATE OF MICHIGAN, County of Marquette, ss:

Mauritz H. Fahlstedt, being duly sworn, deposes and says that he served a true copy of the within notice upon Morgan W. Jopling, of Marquette, Michigan, by leaving the same at his residence at 505 E. Ridge St., in the City of Marquette, on the 2nd day of March, 1918, with Miss Tillie Leskie, an adult person in charge of such residence, the said Morgan W. Jopling being absent from said City. (Signed)

MAURITZ H. FAHLSTEDT.

[SEAL.] (Signed) G. A. CARLSON,

Notary Public,

Marquette County, Michigan.

My Commission expires Apr. 17, 1920.

Filed March 6th, 1918. ELMER W. VOORHEIS, Clerk. 391 United States District Court, Eastern District of Michigan, Southern Division. In Equity.

Former C. C. Case 4117.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Plaintiff and Appellee,

V

ALEX. J. GROESBECK, CASSIUS L. GLASGOW, CHARLES S. CUNNING-HAM, Addison A. Keiser, Morgan W. Jopling, John R. Van Evera, and Fred S. Case, Defendants and Appellants.

COUNTY OF KENT, 88:

Roger I. Wykes being duly sworn deposes and says that he has communicated by telegraph with each of the defendants, John R. Van Evera, Fred S. Case and Morgan W. Jopling, and that each of said defendants has refused to join in the appeal now being taken. ROGER I. WYKES.

Subscribed and sworn to before me this 5th day of March, 1918. GEO. B. KINGSTON, Notary Public, Kent County, Mich.

My commission expires May 28, 1919.

Filed March 6th, 1918. ELMER W. VOORHEIS, Clerk.

392 United States District Court, Eastern District of Michigan, Southern Division. In Equity.

Former C. C. Case 4117.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Plaintiff and Appellee,

VS.

ALEX. J. GROESBECK, CASSIUS L. GLASGOW, CHARLES S. CUNNING-HAM, Addison A. Keiser et al., Defendants and Appellants.

To A. B. Eldredge, attorney for plaintiff:

Please to take notice that we will, on behalf of the above-named defendants, apply to the Hon. Clarence W. Sessions, District Judge, at the Federal Court room, in the City of Grand Rapids, at eleven o'clock A. M., on the 5th day of March, 1918, for an order allowing an appeal to the Supreme Court from the decree entered in said cause on the 13th day of February, 1918, and that we will, on behalf of

the above-named defendants, then and there request severance and permission to appeal without joining such of the other defendants therein as do not appear and join in said appeal.

(Signed) ALEX. J. GROESBECK,

Attorney General.

(Signed)

ROGER I. WYKES,

Of Counsel.

Dated February 27, 1918.

Filed March 6th, 1918. ELMER W. VOORHEIS, Clerk.

393 State of Michigan, County of Marquette, ss:

This 2nd day of March, personally appeared before me, Mauritz H. Fahlstadt, who, being duly sworn, deposes and says that he served the within notice on A. B. Eldredge, by handing the same to him personally, in the City of Marquette, on the 2nd day of March, 1918.

(Signed) MAURITZ H. FAHLSTEDT.

[NOTARIAL SEAL.] (Signed) G. A. CARLSON,

Notary Public,

Marquette County, Michigan.

My Commission expires April 17th, 1920.

Filed March 6th, 1918. ELMER W. VOORHEIS, Clerk.

394 United States District Court, Eastern District of Michigan, Southern Division. In Equity.

Former C. C. Case 4117.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Plaintiff and Appellee,

V8.

Cassius L. Glasgow, Charles S. Cunningham, Addison A. Keiser, Alex. J. Groesbeck, Morgan W. Jopling, John R. Van Evera, and Fred S. Case, Defendants and Appellants.

Now come the said defendants in the above entitled cause, and make and file this, their Assignment of Errors, upon which they will rely upon their prosecution of their appeal from the decree rendered therein by the said Court on February 13, 1918.

(1) That the said Court erred, in refusing to dismiss the Bill of Complaint in said cause, for the reason that the passenger rates therein complained of and fixed in Act 276 of the Public Acts of

Michigan of 1911 were and are, as applied to the said plaintiff, rea-

sonable, sufficient and compensatory.

(2) That the said Court erred, in decreeing said Act 276 of the Public Acts of Michigan of 1911, and the passenger rates therein fixed, to be unreasonable, insufficient and uncompensatory, and in, therefore, restraining the enforcement and operation of said statute and rates as applied to the said plaintiff.

(3) That the said Court erred, in refusing to determine that the plaintiff had not made out a case entitling it to relief by injunction and had not overcome the presumptions which exist in favor of the validity of a rate-fixing statute, and to

dismiss the bill accordingly.

(4) That the said Court erred, in not making more specific findings and determinations as to the values of the property of the plaintiff in the aggregate, and in not finding and determining the value of the property engaged in each of the several services performed by the plaintiff.

(5) That the said Court erred, in not limiting the value of the property of the plaintiff used in its business, and required to be supported by the rates fixed by law, to the amount of the original in-

vestment therein.

(6) That the said Court erred, in using a value for the property of the plaintiff arrived at upon a so-called cost-of-reproduction theory or method, and not representing its fair present value for any of

the years in controversy.

(7) That the said Court erred, in its determination, that the value of the plaintiff's property, and of the individual items thereof, was, for the years 1912 to 1917 inclusive, or for any of such years, greater than the value claimed by the defendants for the said property or for its individual items.

(8) It is claimed that the values of the several items or schedules constituting the inventory and value of the plaintiff's property were not greater than the amounts claimed as the value by the defendants, and that the Court erred wherever it selected, included or used a greater value and amount for the item or schedule than that claimed

by the defendants.

396 (9) That the said Court erred, in determining and using excessive amounts and values for the property of the plaintiff used in its intrastate passenger business in Michigan for each of the

years, 1912 to 1917 inclusive.

(10) That the said Court erred, in the use of an arbitrary and incorrect basis for the separation of the property of the plaintiff commonly used in its passenger and freight businesses between such businesses, and that too great an amount or value of such property was, due to the erroneous methods used, attributed to, and required to be supported by, the intrastate passenger business, and rates fixed by he statute complained of, in Michigan.

(11) That the said Court erred, in not limiting the property of the plaintiff required to be supported by its intrastate passenger business in Michigan to the proper proportion of the property actually used in that business, and in refusing to set off and to deduct a proper proportion of the property of the plaintiff, as used in auxiliary serv-

ices, such as sleeper, diner and mail and express services.

(12) That the said Court erred, in that it found and determined that the net income of the plaintiff from its intrastate passenger business was less than it in fact is or was during the years in controversy. or any of them, and less than it would have been with the statutory rates complained of in operation.

(13) That the said Court erred, in the methods used, and in the results reached, in determining the expenses arising upon, incident to, caused by, and properly attributable to, the passenger business of the plaintiff in Michigan, and particularly upon, by and to the intra-

state passenger business.

(14) That the said Court erred, in not requiring the divis-397 ion of expenses between the respective services upon the plaintiff's line for the years in controversy, and each of them, to be based upon accounts and records kept by the plaintiff for the purpose of showing the cost of, and expenses properly chargeable to, each class

of the service.

(15) That the said Court erred, in dividing the plaintiff's operating expenses between services, as between the freight and passenger services and between the intrastate and interstate passenger services, upon arbitrary and hypothetical formulæ or ratios, which depended solely upon opinion, which did not represent the facts, and the propriety for which was unsupported by any facts, circumstances or proofs in the cause.

(16) That the said Court erred, in attributing too great an amount of the expenses of operation to the plaintiff's passenger business in Michigan and an insufficient amount of the expenses to its freight

business.

(17) That the said Court erred, in refusing and neglecting to set off to the freight service, and to thus deduct from the common expenses, a part of which were attributed to the intrastate passenger service, expenses properly attributable to the maintenance of exclusive freight trackage, thus unduly burdening the plaintiff's intra-

state passenger expenses.

(18) That the said Court erred, in its methods and results, in dividing the Michigan expenses common to the plaintiff's passenger and freight businesses between such services, with the effect that a larger proportion of such common expenses was attributed to the intrastate passenger business of the plaintiff in Michigan than was properly attributable thereto or than actually arose thereon, or than was in

fact caused thereby.

398 (19) That the said Court erred, in determining that the so-called "direct train cost" ratio, as ascertained and used by him, for the division of common expenses of the line of the plaintiff between its passenger and freight services, fairly or properly divided such common expenses between such services, or fairly represented the causes of such expenses, or the effects of use, or the expenses in or by the respective services.

(20) That the said Court erred, in refusing to determine that the gross ton mile ratio would more properly divide expenses of the plaintiff common to its freight and passenger services between those services than the ratio for such division which he used, namely, the di-

rectly-charged train costs in the respective services.

(21) That the said Court erred, in burdening the intrastate passenger operations and business of the plaintiff with the expenses and operations of other businesses, such as sleeper, diner, etc., and in not requiring each business to stand upon its own bottom and to bear its own expenses and costs, thus attributing too great an amount and proportion of expense to the intrastate passenger business of the plaintiff in Michigan.

(22) That the said Court erred, in including in the intrastate passenger business, and requiring that business and the rates therefrom to support, operations and services not a part thereof, and expenses and outlays not properly attributable thereto, by reason of not setting out and excluding expenses arising in the operations over the Mineral Range Railroad, in the operation of sleeper and diner services, in the operation of the mail and express service, and in the operation of the Mackinaw Transportation Company.

(23) That the said Court erred, in attributing too great an amount of the plaintiff's passenger expenses to its intrastate passenger 399 business in Michigan and too small an amount to its interstate

passenger business,

(24) That the said Court erred, in its division of expenses between the intrastate and interstate passenger businesses, in refusing to divide that portion of the passenger expenses attributable to the business carried, or to passengers riding, in sleepers on the basis of the respective actual operations therein, as indicated by the number of passengers traveling interstate and intrastate therein, or upon some other equally proper basis.

(25) That the said Court erred, in refusing to recognize that the interstate passenger business and operations upon the plaintiff's line are largely responsible for the sleeper business and the losses therein, and that a larger part, therefore, of the sleeper business should have

been assigned to the interstate passenger service.

(26) That the s id Court erred, in failing and refusing to separate the operations of the plaintiff over its Western Division from the operations of the remainder of its line, thereby permitting the operations of that division to have the effect of indicating a lesser return from the intrastate passenger operations of the plaintiff than actually

existed thereon.

(27) That the said Court erred, in holding that the loss or deficiency of earnings on plaintiff's line in Michigan, if any would exist with the statutory rate in operation, would be due, in whole or in part, to the intrastate passenger business, whereas such deficiency or loss, if it existed, would in fact be due to the interstate business and operations of the plaintiff, and not to the intrastate passenger business.

400 (28) That the said Court erred, in refusing, in lieu of restraining the operation of said Act 276 of the Public Acts of Michigan of 1911 and the rates therein fixed, to require the plaintiff to put such rates into effect, for the purpose of determining the actual result of operations under the rates, and whether the claimed loss in

revenue due to the decreased rates would in fact result.

(29) That the said Court erred, in assuming and deducting a mathematically-computed loss equal to the difference between the rates in force and the rates fixed upon a two-cent basis as required by law, and in allowing any loss in the absence of proof thereof and in the absence of an experimental operation of the reduced rate to determine whether its effect in operation would be to increase traffic.

(30) That the said Court erred, in refusing to hold the said plaintiff estopped to question the validity of said Act 276 of the Public Acts of Michigan of 1911, and of the rates therein fixed, by reason of the acceptances, by itself and its predecessors, of land grants with conditions attached thereto as indicated by the statutes of the State of

Michigan and the Record in this cause.

(31) That each of the several assignments of error hereinbefore made and set forth is intended to apply equally to each and all of the

years from 1912 to 1917, both inclusive.

Wherefore, the defendants and appellants pray that said decree be reversed, and that the said District Court for the Eastern District of Michigan be ordered to enter a decree reversing the decision of the lower court in said cause.

ALEX. J. GROESBECK, Attorney General; ROGER I. WYKES, LELAND W. CARR, Attorneys for Appellants.

Filed March 6th, 1918. ELMER W. VOORHEIS, Clerk.

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22.

Citation and Acceptance of Service.

United States District Court, Eastern District of Michigan, Southern Division. In Equity.

Former C. C. Case 4117.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Plaintiff and Appellee,

VS.

ALEX. J. GROESBECK, CASSIUS L. GLASGOW, CHARLES S. CUNNING-HAM, Addison A. Keiser, Morgan W. Jopling, John R. Van Evera, and Fred S. Case, Defendants.

UNITED STATES OF AMERICA, 88:

To the Duluth, South Shore & Atlantic Railway Company, Greeting:

You are hereby cited and admonished to be and appear at the Supreme Court of the United States to be held at the City of Washing-

ton, in the District of Columbia, on the 3rd day of April, A. D. 1918, Pursuant to an order allowing an appeal filed and entered in the Clerk's office of the District Court of the United States for the Eastern District of Michigan, from a final decree, signed, filed and entered on the 13th day of February, 1918, in that certain suit, being Former Circuit Court Case No. 4117, in equity, wherein Alex. J. Groesbeck, Cassius L. Glasgow, Charles S. Cunningham, & Addison A. Keiser, are defendants and appellants and you are plaintiff and appellee, to show cause, if any there be, why the decree rendered against

402 the said defendants and appellants, as in said order allowing appeal mentioned, should not be corrected, and why justice

should not be done to the parties in that behalf.

Witness the Honorable Clarence W. Sessions, United States District Judge for the Western District of Michigan, this 5th day of March, 1918.

C. W. SESSIONS, U. S. District Judge, Sitting by Designation for the Eastern District of Michigan.

On behalf of the plaintiff and appellee, I hereby admit due, proper and timely service, by copy, of the within citation.

A. B. ELDREDGE, Attorneys for Plaintiff and Appellee.

STATE OF MICHIGAN, County of Kent, 88:

Roger I. Wykes, being first duly sworn, deposes and says that the annexed citation was served upon the plaintiff and appellee by enclosing and sealing the same in an envelope, properly addressed to the plaintiff's attorney, A. B. Eldredge, at Marquette, Michigan, and depositing the same in the United States mails at Grand Rapids, Michigan with postage fully prepaid thereon, and that the signature of plaintiff's attorney and the signature to acceptance of service on the copy of the original citation is the true, proper and correct signature of said A. B. Eldredge, known by deponent to be such.

(Signed)

Subscribed and sworn to before me this 14th day of March, 1918.

(Signed)

GEO. B. KINGSTON,

Notary Public, Kent County, Mich.

My commission expires May 28, 1919.

Filed March 18, 1918. ELMER W. VOORHEIS, Clerk. 23.

Motion and Order Enlarging Time for Docketing Appeal and Filing Record on Appeal and Second Citation, with Acceptance of Service.

United States District Court, Eastern District of Michigan, Southern Division. In Equity.

Former C. C. Case 4117.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Plaintiff and Appellee,

VS.

ALEX. J. GROESBECK, CASSIUS L. GLASGOW, CHARLES S. CUNNING-HAM, ADDISON A. KEISER, et al., Defendants and Appellants.

Now come the above-named defendants and appellants and move the Court for an order enlarging the time within which they may docket the appeal in said cause and file the record thereof with the Clerk of the United States Supreme Court,

This motion is based on the affidavit of Roger I. Wykes, hereto at-

tached.

403

ALEX. J. GROESBECK, ROGER I. WYKES, Attorneys for Defendants and Appellants.

Dated April 2nd, 1918.

Filed April 4, 1918. ELMER W. VOORHEIS, Clerk.

404 United States District Court, Eastern District of Michigan, Southern Division. In Equity.

Former C. C. Case 4117.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Plaintiff and Appellee,

vs.

ALEX. J. GROESBECK, CASSIUS L. GLASGOW, CHARLES S. CUNNING-HAM, ADDISON A. KEISER, et al., Defendants and Appellants.

STATE OF MICHIGAN, County of Kent, ss:

Roger I. Wykes, being first duly sworn, deposes and says that he is one of the attorneys for the defendants and appellants in the above entitled cause; that the record in said cause is long and complicated,

there being upwards of ten thousand pages of testimony and several hundred exhibits; that the proper making up of a record for the United States Supreme Court involves examination of all the testimony and exhibits, and the abstracting, condensing and elimination of much testimony and many exhibits; that counsel for the respective parties have been considering the subject of the stipulation concerning the record on appeal; that the time which has elapsed since the appeal was claimed has been altogether too short to permit of the completion and docketing of such record; that, as deponent is informed and believes, not less than three months add-tional time should be granted for the docketing of this cause and the filing of the record therein with the Clerk of the United States Supreme Court.

ROGER I. WYKES, Attorney for Defendants and Appellants.

Sworn and subscribed to before me this 2nd day of April, 1918.

GUNSON TAGGART,

Notary Public, Kent County, Michigan.

My commission expires May 9, 1919.

Filed April 4, 1918. ELMER W. VOORHEIS, Clerk.

405 United States District Court, Eastern District of Michigan, Southern Division. In Equity.

Former C. C. Case 4117.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Plaintiff and Appellee,

VS.

ALEX. J. GROESBECK, CASSIUS L. GLASGOW, CHARLES S. CUNNING-HAM, ADDISON A. KEISER, et al., Defendants and Appellants.

On this 2nd day of April, 1918, on reading and filing the motion of the defendants and appellants in the above entitled cause, and the affidavit of Roger I. Wykes accompanying the same, it appearing to the Court that there is good cause shown why the time within which such cause should be docketed and the record thereof filed with the Clerk of the United States Supreme Court should be extended and enlarged, and that the time for enlargement of the same has not expired;

It is hereby ordered that the time granted to the defendants and appellants by rule to docket said cause and file the record thereof with the Clerk of the United States Supreme Court, be, and the same is hereby, extended and enlarged for the period of ninety days from the 3rd day of April, 1918.

C. W. SESSIONS.

U. S. District Judge, Sitting by Designation for the Eastern District of Michigan.

Filed April 4, 1918. ELMER W. VOORHEIS, Clerk. 406 United States District Court, Eastern District of Michigan, Southern Division. In Equity.

Former C. C. Case 4117.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Plaintiff and Appellee,

VS.

ALEX. J. GROESBECK, CASSIUS L. GLASGOW, CHARLES S. CUNNING-HAM, Addison A. Keiser, et al., Defendants and Appellants.

UNITED STATES OF AMERICA, 88:

To the Duluth, South Shore & Atlantic Railway Company, Greeting:

You are hereby cited and admonished to be and appear at the Supreme Court of the United States to be held at the City of Washington, in the District of Columbia, on the first day of May, A. D. 1918, pursuant to an order allowing an appeal filed and entered in the Clerk's office of the District Court of the United States for the Eastern District of Michigan, from a final decree, signed, filed and entered on the 13th day of February, 1918, in that certain suit, being Former Circuit Court Case No. 4117, in equity, wherein Alex J. Groesbeck, Cassius L. Glasgow, Charles S. Cunningham and Addison A. Keiser are defendants and appellants and you are plaintiff and appellee, to show cause, if any there be, why the decree rendered against the said defendants and appellants, as in said order allowing appeal mentioned, should not be corrected, and why justice should not be done to the parties in that behalf.

Witness the Honorable Clarence W. Sessions, United States District Judge for the Western District of Michigan, this second day of April, 1918.

C. W. SESSIONS, U. S. District Judge, Sitting by Designation for the Eastern District of Michigan.

On behalf of the plaintiff and appellee, I hereby admit due, proper and timely service, by copy, of the within citation.

Attorney for Plaintiff and Appellee.

Filed April 4, 1918. ELMER W. VOORHEIS, Clerk. 408 United States District Court, Eastern District of Michigan, Southern Division. In Equity.

Former C. C. Case 4117.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Plaintiff and Appellee,

VR.

ALEX. J. GROESBECK, CASSIUS L. GLASGOW, CHARLES S. CUNNING-HAM, Addison A. Keiser, et al., Defendants and Appellants.

STATE OF MICHIGAN, County of Kent, 88:

Mauritz H. Fahlstedt, being first duly sworn, deposes and says that he served a true copy of the within Motion, Affidavit, Order and Citation upon A. B. Eldredge, President of, and Attorney for, the plaintiff and appellee, by enclosing and sealing the same — an envelope properly addressed to said A. B. Eldredge at Marquette, Michigan, and depositing the same in the United States Mails at Grand Rapids, with postage fully prepaid thereon, this 3rd day of April, 1918.

MAURITZ H. FAHLSTEDT.

Sworn and subscribed to before me this 3rd day of April, 1918.

ABNER D. DILLEY,

Notary Public, Kent Co., Michigan.

My commission expires Aug. 1, 1918.

Filed April 4, 1918. ELMER W. VOORHEIS, Clerk. 409

24.

Motion and Order of September 13, 1918, Extending Time for Docketing Appeal and Returning Record.

United States District Court, Eastern District of Michigan, Southern Division. In Equity.

Former C. C. Case 4117.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Plaintiff and Appellee,

VS.

ALEX. J. GROESBECK, CASSIUS L. GLASGOW, CHARLES S. CUNNING-HAM, Addison A. Keiser, et al., Defendants and Appellants.

This matter coming on to be heard upon the motion of counsel for the plaintiff asking that the time allowed said counsel for plaintiff within which to present amendments to the proposed transcript of record on appeal in said cause may be extended to thirty days from September 15, 1918, the plaintiff consenting as a condition to said order that the time within which the defendants may return the record and docket the appeal may be extended for a period of sixty days from September 30, 1918, said motion being based upon the affidavit of John E. Tracy, of counsel for the plaintiff, and upon the telegraphic stipulation of Roger I. Wykes, of counsel for the defendants filed herein:

On motion of John E. Tracy, of counsel for the plaintiff, it is ordered, that the time within which plaintiff may present its amendments to the proposed record on appeal be extended to thirty days from September 15, 1918, and that the time within which the defendants may return the record and docket the appeal in said cause be extended until sixty days from September 30, 1918.

C. W. SESSIONS, District Judge.

Dated Sept. 13th, 1918.

Filed Sept. 13, 1918. ELMER W. VOORHEIS, Clerk. 410 United States District Court, Eastern District of Michigan, Southern Division. In Equity.

Former C. C. Case 4117.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Plaintiff and Appellee,

V8.

ALEX. J. GROESBECK, CASSIUS L. GLASGOW, CHARLES S. CUNNING-HAM, Addison A. Keiser, et al., Defendants and Appellants,

Now comes the plaintiff and moves the Court for an order extending the time within which the plaintiff may present its amendments to the proposed transcript of record on the appeal of said cause to thirty days from the 15th day of September, 1918, the plaintiff consenting as a condition of said order that an additional order may be entered extending the time within which the defendants may return the record and docket the appeal in said cause to sixty days from September 30, 1918.

This motion is based on the affidavit of John E. Tracy hereto attached, and upon the telegraphic stipulation of Roger I. Wykes, of counsel for the defendants in said cause, also herefo attached.

JOHN E. TRACY, Of Counsel for Plaintiff.

Dated Sept. 10, 1918.

Filed Feby. 13, 1918. ELMER W. VOORHEIS, Clerk.

411 United States District Court, Eastern District of Michigan, Southern Division. In Equity.

Former C. C. Case 4117.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Plaintiff and Appellee,

VS.

ALEX. J. GROESBECK, CASSIUS L. GLASGOW, CHARLES S. CUNNING-HAM, Addison A. Keiser, et al., Defendants and Appellants.

STATE OF MICHIGAN, County of Marquette, 88:

John E. Tracy, being duly sworn, on oath says that he is of counsel for the plaintiff in the above entitled action, having principal charge of said suit since the death of A. B. Eldredge, Attorney of Record for the plaintiff therein; that on the 5th day of September,

1918, plaintiff's attorneys were served by the defendants with a copy of the proposed transcript of record on appeal in said cause and are now engaged in examining the same and preparing proposed amendments thereto; that said record was a very voluminous one, containing 1752 pages, and that the time allowed by the Rule is insufficient within which to properly examine the said proposed record and prepare such amendments; and that a reasonable time within which counsel for plaintiff would be able to examine said proposed record and prepare such amendments would be thirty days from the 15th day of September, 1918.

JOHN E. TRACY.

Subscribed and sworn to before me this 10th day of September, 1918.

LOUISE M. LA VIGNE, Notary Public in and for said County.

My commission expires Feb. 6, 1921.

Filed Feby. 13, 1918. ELMER W. VOORHEIS, Clerk.

412

Lansing, Mich., Sept. 10—1:30 p.

M. E. Lehnen, Secy., Marquette:

In South Shore rate case will stipulate to extend plaintiff's time to present amendments to proposed record for thirty days provided time to return record and docket appeal is also extended sixty days from Sept. thirtieth. Use this telegram making show of cause and secure both extensions on one order.

ROGER I. WYKES.

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25.

Stipulation re Exhibits, Dated Sept. 16, 1918.

United States District Court, Eastern District of Michigan, Southern Division. In Equity.

Former C. C. Case 4117.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Plaintiff and Appellee,

VS.

ALEX. J. GROESBECK, CASSIUS L. GLASGOW, CHARLES S. CUNNING-HAM, Addison A. Keiser, et al., Defendants and Appellants.

In this cause, it is stipulated by the respective parties, through and by their respective counsel, as follows:

(1) As there are two of the plaintiff's exhibits marked with the number 214, it is agreed that the second of those exhibits, being "I. C. C. Classification of Operating Revenues and Operating Expenses," may be re-marked by the Clerk as Exhibit 214a.

(2) As two of plaintiff's exhibits were marked with the number 219, it is agreed that the second exhibit so marked, being "I. C. C. Classification of Income, Profit and Loss," may be re-marked by the

Clerk as Exhibit 219a.

(3) The 21 sheets of assessed values and of figures appearing on the informal roll for Marquette City, found between pages 5164 and 5165 of the record, may be marked by the Clerk as Defendants' Exhibit 27a and filed and returned as an exhibit in this cause.

(4) Duplicates of Defendants' Exhibits 23, 24 and 25, as appearing on pages 5106, 5111 and 5117 of the record, may be filed with the Clerk, marked by him with the proper exhibit numbers, and filed

and returned with the other exhibits in this cause.

(5) The Appendix to Defendants' Exhibit 72 may be filed with the Clerk, marked by him as Defendants' Exhibit 72a, and filed and

returned as an exhibit in this cause.

414 (6) It is agreed that the printed compilations and comparison of Complainant's Exhibits 1, 1a and 50, and Defendants' Exhibit 15 with modifications, was prepared by the parties jointly, is what it purports to be and includes what it purports to include, and will be filed with the Clerk as a detail of the enumerated exhibits, and returned by him with the record, as an exhibit. Additional copies of this document, sufficient in number to comply with the rule, are now printed and will be furnished.

(7) The Master's report having been printed, a printed copy thereof may be filed with the Clerk, and when so filed will be re-

turned as one of the proceedings in the cause.

(8) That Complainant's Exhibits 31, 32, 33, 34, 35, 35A, 33, 36A, 37, 38, 41, 42, 43, 44, 45, 45A, 46, 47, 47A, 48, 48A, 52, 53, 54, 55, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, and 87, having been printed, it is agreed that a bound volume of such exhibits, as printed, may be substituted for the originals, and that such bound volume may be returned with the original exhibits.

JOHN E. TRACY, Of Counsel for Plaintiff. ROGER I. WYKES, Attorney for Defendants.

Dated Sept. 16, 1918.

Filed October 28, 1918. ELMER W. VOORHEIS, Clerk. 415 UNITED STATES OF AMERICA:

In the District Court of the United States for the Eastern District of Michigan, Southern Division. In Equity.

No. 4117.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Plaintiff,

ALEX. J. GROESBECK, CASSIUS L. GLASGOW, CHARLES S. CUNNING-HAM, Addison A. Keiser, Morgan W. Joplin, John R. Van Evera, and Fred S. Case, Defendants.

Eastern District of Michigan, Southern Division, ss:

I, Elmer W. Voorheis, Clerk of the District Court of the United States for the Eastern District of Michigan, do hereby certify and return to the claim of appeal of the above named defendants; that the foregoing is a true copy of all the records and proceedings, stipulated by counsel for respective parties to be included in my said return, as well as a true copy of narrative statement of the testimony in said cause not attached hereto, but certified under separate cover and consisting of four volumes, typewritten and each volume duly certified, all of which four bound volumes, and matter attached hereto, I have compared with the originals on file and of record in my office, and is a true and correct transcript therefrom and of the whole thereof as designated by counsel, with the exception of certain original exhibits designated by counsel to be by me sent up supplemental to the copies herein certified, which original exhibits are being transmitted securely boxed by express, and made a part of this my return in accordance with order of court dated October 30th 1918.

In testimony whereof, I have hereunto set my hand and affixed the seal of said court, at Detroit, in said District, this 21st day of November, in the year of our Lord one thousand nine hundred and eighteen, and of the Independence of the United States of America the one hundred and forty-third.

[Seal of the U. S. District Court, Eastern District of Michigan.]

ELMER W. VOORHEIS, Clerk United States District Court, Eastern District of Michigan. 4151/2

Vol. 1.

United States District Court, Eastern District of Michigan, Southern Division. In Equity.

Former C. C. Case 4117.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Plaintiff and Appellee,

VS.

ALEX. J. GROESBECK, CASSIUS L. GLASGOW, CHARLES S. CUNNING-HAM, Addison A. Keiser, et al., Defendants and Appellants.

As attorney for plaintiff in the above entitled cause, I hereby acknowledge service upon the plaintiff of a copy of a præcipe designating the exhibits to be returned and indicating the portions of the record to be incorporated in the transcript of record on the appeal of said cause to the Supreme Court, said præcipe being accompanied with a statement of the testimony indicated by the defendants as necessary to be incorporated into the transcript of record, and a statement by the defendants for the purpose of limiting the record on appeal, the same being embraced in four volumes, covering 1,752 pages, and having been received by me at Marquette, Michigan, on September 5, 1918.

JOHN E. TRACY, Of Counsel for Plaintiff.

Dated Sept. 5, 1918.

STATE OF MICHIGAN, County of Kent, 88:

Roger I. Wykes, being first duly sworn, deposes and says that the above listed documents were duly sent to Mr. A. B. Eldredge at Marquette, before his death, as service upon the plaintiff, and that such documents so served are the same as, and duplicate copies of, the præcipe, testimony and statement filed herewith, and that the foregoing acknowledgment of service and the signature of Jno. E. Tracy thereto are what they report to be, and that such signature is genuine.

ROGER I. WYKES, Attorneys for Defendants.

Subscribed and sworn to before me, this 7 day of October, 1913.

GRANT SIMS.

Notary Public, Kent County, Michigan.

My commission expires May 20, 1922.

417 United States District Court, Eastern District of Michigan, Southern Division. In Equity.

Former C. C. Case 4117.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Plaintiff and Appellee,

VS.

ALEX. J. GROESBECK, CASSIUS L. GLASGOW, CHARLES S. CUNNING-HAM, Addison A. Keiser, et al., Defendants and Appellants.

To A. B. Eldredge, solicitor for plaintiff:

In conformity with United States Supreme Court Rule No. 8, there is sent you, by American Express, a copy of a præcipe to le filed with the Clerk of said Court indicating the portions of the record to be incorporated into the transcript of record on the appeal of said cause.

The formal pracipe is preceded by a statement of the questions intended to be raised and insisted upon under the assignment of errors by the defendants, together with, stated in narrative form, so much of the testimony as the defendants desire incorporated into the transcript of record on appeal.

This præcipe, statement and testimony are sent you for the pur-

poses:

(1) Of complying with said rule 8, and permitting you to designate such additional portions of the record as you desire incorporated into the transcript of record to be filed in the Supreme Court.

(2) As a basis of stipulation, if you desire to consider entering

into such stipulation. Yours, etc.,

Dated August 30, 1918.

A. J. GROESBECK, Attorney General. ROGER I. WYKES, Of Counsel.

418 United States District Court, Eastern District of Michigan, Southern Division. In Equity.

Former C. C. Case 4117.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Plaintiff and Appellee,

VS.

ALEX. J. GROESBECK, CASSIUS L. GLASGOW, CHARLES S. CUNNING-HAM, Addison A. Keiser, et al., Defendants and Appellants.

Mauritz H. Fahlstedt, being first duly sworn, deposes and says that he served upon the plaintiff the attached notice, by enclosing

and sealing a true and compared copy thereof in an envelope properly addressed to A. B. Eldredge, Marquet.e, Michigan, attorney for plaintiff, and depositing the same in the United States mails at Gran l Rapids, Michigan, with charges fully prepaid thereon, on September 4, 1918.

That on September 3, 1918, he sent to A. B. Eldredge, by American Railway Express, with charges fully prepaid thereon, four volumes, containing the praccipe, a statement of points to be raised, and a statement of the testimony, for the purpose of limiting the record, pursuant to United States Supreme Court Rule No. 8.

MAURITZ H. FAHLSTEDT.

Subscribed and sworn to before me this 4th day of September. 1918.

L. D. AVERILL, Notary Public, Kent County, Michigan.

My commission expires Jan. 26, 1920.

United States District Court, Eastern District of Michigan, Southern Division. In Equity.

Former C. C. Case 4117.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Plaintiff and Appellee.

VS.

ALEX. J. GROESBECK, CASSIUS L. GLASGOW, CHARLES S. CUNNING-HAM, Addison A. Keiser, et al., Defendants and Appellants.

To Elmer W. Voorheis, clerk of said court:

An appeal having been claimed and allowed by said Court, this præcipe is herewith filed with you to indicate that it is the desire of the parties that you incorporate in the transcript of the record upon appeal the pleadings, documents, statement of evidence and stipulations and return the exhibits listed as follows:

Bill of Complaint. (Filed July 26, 1911. Docket No. 1.)
Order extending Time for Return on Order to show Cause, etc.
(Filed Sept. 26, 1911. Docket No. 19.)
Answer. (Filed Dec. 2, 1911. Docket No. 21.)

Replication. (Filed Dec. 26, 1911. Docket No. 22.) Order appointing Special Master. (Filed May 17, 1912. Docket

Opinion on Motion for Preliminary Injunction. (Filed May 29, 1912. Docket No. 45.)

Order continuing Preliminary Injunction conditionally. (File.)
May 29, 1912. Docket No. 46.)

Bond of Complainant in pursuance of Order of Court dated May 29, 1912. (Filed June 13, 1912. Docket No. 48.)

Order continuing Restraining Order. (Filed Jan. 23, 1913. Docket No. 65.

Præcipe for Appearance. (Filed Dec. 10, 1914. Docket No. 420

Motion for Order permitting Appearance. (Filed Dec. 10, 1914. Docket No. 74.)

Stipulation regarding Corporate and Land Grant History. (Filed

Dec. 10, 1914. Docket No. 77.)

Memorandum Order in re Deposit in Clerk's Office of Bank Receipts of one-third of Plaintiff's Gross Earnings. (Filed Oct. 25, 1915. Docket No. 78.)
Order regarding Fund to secure Payment of Refund Coupons.

(Filed Oct. 29, 1915. Docket No. 80.)

Stipulation as to Certain Exhibits (substituting Duplicates, on account of Originals missing). Filed Feb. 1, 1917. Docket No.

Report of Special Master, Herbert L. Baker. (Filed Feb. 1, 1917.

Docket No. 340.)

Defendants' Exceptions to the Report of the Special Master. (Filed Feb. 20, 1917. Docket No. 343.)

Complainant's Exceptions to the Report of the Special Master. (Filed Feb. 26, 1917. Docket No. 344.)

Opinion on Pleadings and Proofs. (Filed Jan. 9, 1918. Docket No. 362.)

Final Decree. (Filed Feb. 14, 1918. Docket No. 368.)

Petition for and Allowance of Appeal, and Assignment of Errors. (Filed March 6, 1918. Docket No. 369.)

Citation, with Acceptance of Service.

Motion and Order enlarging Time for Docketing Appeal and filing Record on Appeal, and Second Citation, with Acceptance of Service.

Motion and Order of Sept. 13, 1918, extending Time for docketing Appeal and returning Record.

Stipulation re exhibits. (dated Sept. 16, 1918.)
The Statement by the Defendants for the purpose of limiting the Record on Appeal, filed herewith.

Statement of the testimony taken before the Special Master and before the District Court, filed herewith.

This Præcipe.

421 You are also requested to send up with this transcript the following original exhibits:

Plaintiff's exhibits before the master:

Riggs, Appraisal of D. S. S. & A. Ry. in Michigan and Wisconsin as of June 30, 1911.

1a Riggs, Appraisal of D. S. S. & A. Ry. in Michigan as of June 30, 1913, showing Allocations to Services.

1b Riggs, Inventory and Allocation of Lands to Services as of June 30, 1913.

1c Riggs, Exhibit 1b amended.

Riggs, Condensed Profile, D. S. S. & A. Ry. (on same form as Defts,' Ex. 17). 3

Riggs, Map of Sault Terminal, Scale 1" equals 150'.

3a Riggs, Map of Sault Terminal, showing Allocations, Scale 1" equals 150'.

Riggs, Map of St. Ignace Terminal, Scale 1" equals 200'.

4a Riggs, Map of St. Ignace Terminal, showing Allocations, 1" equals 200'. 5

Riggs, Map of Marquette and Vicinity, Scale 1" equals 2,000'.

6 Riggs, Marquette Yard Map, Scale 1" equals 200'.

6a Riggs, Marquette Yard Map, showing allocations, Scale 1" equals 200'. 8

Riggs, Mining District, Negaunee and Ishpeming, Scale 1" equals 1,000'.

Riggs, Comparative Summary of Totals of Michigan, 1900, 12 1905 and 1911, Appraisals. Riggs, Right of Way Property Map of D. S. S. & A. Ry., 15

Negaunee and Ishpeming, Scale 1" equals 400'.

15a Belden, Portion of Ishpeming Yard at Station, Scale 1" equals 17

Belden, Map of Negaunee, C. C. I. Co. Print.

Delf, I. C. C. Classification of Locomotive Train and Car Mile-25 age, first issue, 1907.

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- 26 Delf, I. C. C. Classification of Operating Revenue. First Issue 1907.
- 27 Delf, I. C. C. Classification of Expenditures for Additions and Betterments. 1st revised issue 1910. 28

Delf, I. C. C. Classification of Operating Expenses. 3rd revised issue 1907.

Delf, I. C. C. Supplement to Exhibit 28, 1908. 29

Delf, I. C. C. Classification of Revenue and Expenses for Out-30 side Operations. First Issue 1908. 31

Delf, Statement of Mileage of road owned, 1910-1911-1912. Printed.

32 Delf, Revenue Locomotive Mileage, 1910-1911-1912. 33

Delf, Revenue Train Mileage, 1910-1911-1912. Printed. 34

Delf, Car Mileage, 1910-1911-1912. Printed. 35

Delf, Operating Revenues, 1910-1911-1912. Printed. 35a Delf, Substitute Analysis of Joint Facilities.

Printed. Delf, Division of Operating Revenue in Michigan, assigned to 36 freight and passenger, 1910-1911-1912. Printed.

36a Delf, Substitute Analysis of Joint Facilities. Printed.

- Delf, Routes and Compensation for Hauling Mail, 1907-1912. 37 Printed.
- Delf, Statement of Operating Expenses, 1910-1911-1912. 38 Printed. 39
- Delf, D. S. S. & A. Report to Stockholders for 1911. Delf, D. S. S. & A. Report to Stockholders for 1912. Printed. 40 Printed.

Delf, Outline of Method used in dividing Operating Expenses 41 between States and Services. Printed.

Delf, Tons of Freight Carried, Length of Haul, Rate per Ton, 42

etc. Printed.

Delf, Passenger Statistics in Michigan, Numbers of Passengers 43 Carried, Length of Haul, Rate, etc. Printed. 1902-1912.

423

Delf, Freight Statistics, Michigan, 1912. Printed.

44 Delf, 1910 Business, Summary of Revenue, Operating Expenses, 45 Divisions and Results. Printed.

45a Delf, Detail of Divisions to Freight and Passenger for certain

Printed. items.

Delf, Method of Equation of Passenger Business, in Divisions 46 between Interstate and Intrastate. Printed. Delf, 1911 Business, Summary of Resources, Opperating Ex-47

penses, Divisions and Results. Printed.

47a Delf, Details of Divisions to Freight and Passenger for certain items. Printed. Delf, 1912 Business, Summary of Revenue, Operating Expenses,

48 Divisions and Results. Printed. 48a Delf, Detail of Divisions to Freight and Passenger for certain items. Printed.

Riggs, Modifications of Exhibit 1, as made or indicated in Cross

Examination.

Delf, Statement showing Loss by Act 276, 1910, 1911, 1912. 52 Printed.

Population and Railroad Mileage in Michigan, 1910. Printed. 53 Delf, Operations, Resources and Disposition of Complainant, 54 1887-1913. Printed.

Delf, Operating Income, Expenses, Ratios, Maintenance, Taxes, 55 Various Roads. Printed.

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50

McPherson, D. S. S. & A. Train Sheet for Feb. 4, 1912.

61 McPherson, Chart showing Actual D. S. S. & A. Train Move-62 ments, Houghton Division, for Feb. 4, 1913.

McPherson, Time Table #228, Houghton Div., Jan. 5, 1913. 63

McPherson, Movement of Passengers for 1912. 64

McPherson, Delf's Statement of Tickets Sold in Michigan, 1911. 65 Delf, Accounts, Separation and Results for 1913. Printed. 67

Delf, Estimate of Loss for 1913. 68

Delf, Operating Expenses Divided between States and Services 69 by primary accounts in Detail, 1910. Printed.

Delf, Operating Expenses Divided between States and Services 70 by primary accounts in Detail, 1911. Printed.

Delf, Operating Expenses Divided between States and Services 71 by primary Accounts in Detail, 1912.

Delf, Operating Expenses Divided between States and Services 72 by primary account in Detail, 1913.

Del., Freight Traffic Standier, 1914. 73

- 74 Delf, Michigan Freight Station Service, 1912.
- 75 Delf, Michigan Freight Train Mileage, 1912.
- 76 Delf, Michigan Freight Expense, 1912.
- Delf, Michigan Freight Revenue, Interstate and Intrastate, 77 1912
- 78 Delf, Michigan Freight Expense, 1913.
- 79 Delf, Michigan Freight Revenues, Interstate and Intrastate, 1913.
- 80
- Delf, Michigan Freight Train Mileage, 1913. Delf, Values of Individual Locomotives, Separated to Services 81 by Mileages, 1913. Printed. 82
- Delf, Bank Balances, 1902-1911. Printed.
- 83 Delf, Locomotive Mileages Separated to Services, 1910-1913, Printed.
- 425
- 84 Delf, 1913 Intermingling Mileages, by Months, of Certain Locomotives used in Common or in more than one Service. Printed
- Delf, Ticket Sales, Years ended June 30, 1911, 1912, 1913. 85 Printed.
- 86 Delf, Locomotive Repairs, to Locomotives by numbers, 1910-1913. Printed.
- 87 Delf, Complainant's Exhibits regarding less than car loads, station service, 1913.
- 93 Davis, Map of Negaunee, C. C. I. Co.
- 94 I. C. C. Classification of Operating Expenses, 1914. 95
- Berry, Speed Chart, St. Ignace to Marquette, July 16, 1914. Printed Volume of Complainant's Exhibits before the Master, 31 to 38 inclusive and 35a and 36a, 41 to 48 inclusive and
- 45a and 48a, 52 to 55 inclusive, and 67-87 inclusive. Printed Comparative Tabulation of Valuation Exhibits (Plaintiff's 1, 1a and 50 and Defts.' 15).

Defendants' exhibits before the master:

- Robertson, List of Property in Marquette.
- 10 Delf, showing Maintenance Expenses by Divisions, April 1910, May, 1911, and Year 1912. 11
- Delf, Speed of D. S. S. & A. Passenger Trains. 13 Delf, Speed of Freight Trains on D. S. S. & A.
- 15 Hansel, Appraisal of D. S. S. & A. Property in Michigan as of October 1, 1912.
- Hansel, Condensed Profile, D. S. S. & A. (on same form as 17 Complt.'s Ex. 2).
- 18 Hansel, Map of Sault Terminal, Scale 1" equals 150'.
- Hansel, Map of St. Ignace Terminal, Scale 1" equals 200'. 19
- Hansel, Map of D. S. S. & A. Property at Marquette, Scale 1" 20 equals 200'. 426
- Hansel, Right of Way Map, D. S. S. & A. Property in Mining 21 Region at Negaunee and Ishpeming, Scale 1" equals 400'.

- Vol. 5, 1900 State Appraisal of D. S. S. & A., pages 64-99. 23
- Summary Sheet, 1902 State Appraisal of D. S. S. & A. 24 Summary Sheet, 1905 State Appraisal of D. S. S. & A. 25

Report of State Board of Equalization, 1911. 26

27 Computation by Parker, showing Values and Assessments.

Tabulation by Parker, showing Values placed on certain Real 27aEstate in Marquette by Citizens' Committee.

Computation, by Parker, of Sales, 2 and 10 mile belt. Report of State Board of Equalization, 1901. 30

31 32 Report of State Board of Equalization, 1906.

Adams, Large Land Grant Map. 41

- Printed D. S. S. & A. Ry. Reports; 1905; a, 1906; b, 1907; 43 c, 1908; d, 1909; e, 1910; h, 1913.
- Delf, Additions and Betterments, 1900 to 1913. 46 Statements of South Shore Land Co., 1904-1913. 61
- Report of State Tax Commission and State Board of Ascessors, 62 1911 and 1912.
- Arguments before State Board of Assessors by D. S. S. & A. 61 Representatives, 1904-1905 and 1907.

Report of Land Grant Trustees, D. M. & N., Feb. 1879, to Jan. 65 1, 1912.

Certain Tabulations of J. P. Muller, relative to methods for 70 dividing Operating Expenses. (Marked Ex. 98, through

C art showing Corporate Relationships of D. S. S. & A. and Constituent Companies. (Marked Ex. 99, through error.) iompson, Schedule of Operating Expenses on D. S. S. & A., 72

1912, introduced June 3, 1914.

mpson, Derivation of Ratios-Appendix A. 72

731 Geological Map of Upper Peninsula.

4

er, Gross Ton-mile Data for Division of 1913 Accounts. 74

77 P. r. 1913 Revenue, Distribution of Operating Expenses and Csults.

Delf, Western Rate Inquiry, pages 68-69. Comparison of 80 Methods of separating Operating Expenses.

Batchelder, Three Blue Prints showing D. S. S. & A. Rail Sec-83 tions, and Wear on Upper and Lower Sides of Rail on Curves.

Exhibits to the master's report as follows:

Computations to arrive at Figures in Master's Exhibit I. (Filed Feb. 1, 1917. Docket No. 339.)

Exhibit A, and numbers 1 to 8, to Report of Master. Feb. 1, 1917. Docket No. 341.)

Computations to arrive at Figures in Master's Exhibits 2 to 8. (Filed Feb. 1, 1917. Docket No. 342.)

- 428 Plaintiff's exhibits before the court (on the trial):
- 201 Cadarette, Valuation of D. S. S. & A. Ry, in Michigan as of June 30, 1917, showing Retirements and Additions since June 30, 1913. 201a Cadarette, Valuation of D. S. S. & A. Ry. Property as of

June 30, 1914. 201b Cadarette, Valuation of D. S. S. & A. Ry. Property, as of

June 30, 1915. 201c Cadarette, Valuation of D. S. S. & A. Ry. Property, as of June 30, 1916.

202 203

Delf, Operating Statistics, D. S. S. & A. Fiscal Year, 1914. Delf, Operating Statistics, D. S. S. & A. Fiscal Year, 1915. Delf, Operating Statistics, D. S. S. & A. Fiscal Year, 1916. Delf, Operating Statistics, D. S. S. & A. Fiscal Year, 1917. 204 205

Delf, Operating Expenses, Assignments and Results of passenger Operation for Fiscal Year 1914. 206

207 Delf, Same as 206, for Fiscal Year 1915, 208

Delf, (Same as 206), for Fiscal Year 1916. 209 Delf, (Same as 206), for Fiscal Year 1917, and Cost of Maintaining Exclusive Freight Tracks, 1914-1915-1916-1917.

210 Delf, Division used in assigning to Passenger the Michigan Operating Expenses for 1914-1915-1916-1917.

211 Fowler, Locomotive Values, 1914-1915-1916-1917.

211a Fowler, Unit Prices used for Locomotives, 1914-1915-1916-1917.

212 Fowler, Passenger-train Car Values, 1914-1915-1916-1917. 213 Fowler, Freight-train Car Values, 1914-1915-1916-1917.

214 Fowler, Values of Shop Machinery and Tools, 1914-1915-1916-1917.

214a Delf, I. C. C. Classification of Operating Revenue and Operating Expenses. 429

215 Delf, Index to Exhibit 214a.

Delf, I. C. C. Classification for Additions and Betterments. Delf, I. C. C. Rules for separating Operating Expense between 216 217

Freight and Passenger. 218 Delf, I. C. C. Classification of Train Miles, Locomotive and Car Miles.

Delf, I. C. C. Classification of Income, Profit and Loss. Delf, D. S. S. & A. Track Chart of Houghton Division. 219a 219

220 Delf, Statement of D. S. S. & A. Ry. in Michigan, showing total operations, Freight and Passenger, and Net Income from Total Business.

221 Rates of return on Certain Property Schedules.

Defendants' exhibits before the court (on the trial):

301 Land Map, of Rural Lands of D. S. S. & A.

302 Claims of Value of D. S. S. & A. Land.

303 Assessed Values of D. S. S. & A.

304 1914 Report D. S. S. & A. to State Board of Assessors. 305 1915 Report D. S. S. & A. to State Board of Assessors.

1916 Report D. S. S. & A. to State Board of Assessors. 306

Additions and Betterments; reported to the State, 1914-1916. 307 Parker computation for 1917.

Traffic Statistics, D. S. S. & A. 1902-1917. 308

Tonnage of D. S. S. & A. Passenger Trains from Train Con-309 sists.

Mileage of Foreign Sleepers on D. S. S. & A. Passenger Miles 310 in Same, and Average Number of Passengers per Car Mile, 1916-1917.

Passenger Miles in Foreign Sleepers on D. S. S. & A. Inter-311

state and Intrastate, 1916-1917.

312 Passenger Miles in D. S. S. & A. Sleepers, Interstate and Intrastate, 1916-1917.

430

313 Passenger Miles subdivided to Coaches and Sleepers, on D. S. S. & A., 1916-1917.

314 Passenger and Freight Train Weights per Train Mile, 1912-1917.

315 Average Weights of D. S. S. & A. Passenger Equipment, per

Car Mile, 1912-1913-1914-1917. 316 1881 Original Report of D. M. & M. to Railroad Commissioner.

Articles D. M. & M, 318

319 Dadson Analysis of Reports, M. H. & O., M. & W., D. M. & M., M. & M. Rd, and D. S. S. & A.

320 Prof. Williams' Exhibit of Track Stresses under Traffic, etc. Kates' Valuation, Present Locomotive Equipment of D. S. S. & 321 A. 1914-1917.

321a Kates' Valuation of Locomotives on D. S. S. & A. Retired since September 1913, amending Exhibit 321.

322 Kates' Valuation of Passenger Cars, 1914-1917.

323 Kates' Valuation of D. S. S. & A. Freight Cars, 1914-1917. 324 Kates' Locomotive Price Units, etc.

325 Parker, Separation of Accounts, Revenues, Expenses and Results, 1914-1917.

325a Parker, showing amounts of Maintenance of Way and Structures expenses assigned on different Bases, 1917.

325b(Same as 325a) except for 1914. 325c(Same as 325a), except for 1915.

325d (Same as 325a), except for 1916.

326 Intrastate and Interstate Passenger Miles of D. S. S. & A. Compared, 1910-1917.

326a Revision of Exhibit 326, also Computation made at request of Mr. Tracy.

Kates, Mortality, Depreciation and Expectancy Curves used in his Valuation of Equipment. 327329

Hillman, Division of Accounts, Revenues, Expenses and Results, 1914-1917.

330 Hillman, Mackinaw Transportation Company Expenses and and Passenger Revenues, 1914.

431

331 Hillman, Average Tie Life on D. S. S. & A. 332 Hillman, State's Claim of Valuation in 1913, plus Additions and Betterments subsequent.

333 Hillman, Master's Valuation in 1913 brought to date.

Hillman, Master's and State's Valuation- for 1913, 1914, 1915, 334 1916, 1917.

335 D. S. S. & A. Forms for Distribution of Track Material, etc.

336 D. S. S. & A. Forms for Distribution of Track Labor.

337 Parker, Assignment (or Redistribution) of Expenses of Sleeper Service to Passengers and Baggage, Intrastate and Interstate, 1917. 338

Parker, Redistribution of Sleeper Expenses, on Express Weight

Basis, 1917.

Hillman, State's Claimed Value for 1913, plus Additions and 339 Betterments of 1914-1917, and Computations of Net Return. 340 Hillman, Constant Costs which would exist regardless of

Sleeper and Diner Service, 1915, 1916, 1917.

341 Hillman, Amounts paid Soo Union Depot Employees, 1917. 342 Hillman, Amounts of Expenses assigned on Various Factors (Maintenance of Way and Structures). 343

Parker, Value of Property in Michigan distributed to Services

on Time Basis, 1914.

Parker, Value of Property in Michigan distributed to Services on Time Basis, 1915. 344 345

Parker, Value of Property in Michigan distributed to Services on Time Basis, 1916.

Parker, Value of Property in Michigan distributed to Services 346 on Time Basis, 1917.

Parker, Computations of Net Return on Basis of Ex. 325, 347 1914-1917.

Dated October 29, 1918.

ROGER I. WYKES, Attorney for Defendants & Appellants.
JOHN E. TRACY, Attorney for Plaintiff & Appellee.

You are requested to return the bound volume of map ex-432 hibits, which contains Plaintiff's exhibits 2 to 10 inclusive, 3a, 4a, 6a, 10a, 10b, 15 to 17 inclusive, 15a, 16a, 19 to 24 inclusive, 66 and 93; also Defendants' exhibits 17 to 22 inclusive, 39, 42, 52 and 73.

Plaintiff's exhibits 201 to 210 inclusive are included in a single printed volume.

The printed report of the Master may be substituted for the type-

written report for use in the Celrk's transcript.

The Railroad Map of the State of Michigan, marked Exhibit A-1 for the use of the Court on the trial, should be returned with the other exhibits.

433 The parties defendant are the present (October 29, 1918) Attorney General and members of the Michigan Railroad Commission, and the various incumbents of such offices, from the institution of the proceeding to the present time, have been from time to

time substituted by proper stipulations and orders.

It is hereby agreed that the pleadings above listed will be included in the transcript of record on appeal, and that the originals of the exhibits above listed (or copies thereof which have been duly substituted as originals) will be returned to the Supreme Court as the record on appeal, and we consent to an order directing the return of such exhibits as originals, subject, however, to the right to have further exhibits returned as provided by the rules in case it shall later be found that anything is inadvertently omitted.

Dated October 29, 1918.

ROGER I. WYKES. Attorney for Defendants and Appellants.
JOHN E. TRACY, Attorney for Plaintiff and Appellee.

It is hereby ordered that the exhibits listed above be transmitted to the Clerk of the United States Supreme Court for inspection by said Court and be considered as a part of the record on appeal and be returned to this Court upon the determination of such appeal or at such other time as may be directed by proper order.

Dated October 30", 1918.

C. W. SESSIONS, District Judge.

United States District Court, Eastern District of Michigan, 1 Southern Division. In Equity.

Former C. C. Case 4117.

DULUTH, SOUTH SHORE & ATLANTIC RAILWAY COMPANY, Plaintiff and Appellee,

ALEX. J. GROESBECK, CASSIUS L. GLASGOW, CHARLES S. CUNNING-HAM, Addison A. Keiser, et al., Defendants and Appellants.

RECORD ON APPEAL.

Statement by Defendants for the Purpose of Limiting the Record on Appeal.

(1) No question will be raised by defendants of the cost of reproduction of the property and depreciated value of that cost, as found by the Master as of June 30, 1913, in the amount of \$13,945,846, except as to the items following:

(a) Item 1, Right of Way & Station Grounds. The Master found a cost of reproduction of \$1,780,239, as against defendants' claim of \$1,145,413. Defendants will contest the values for land as found by the Master for lands located in St. Ignace, Sault Ste. Marie,

Marquette City and Marquette County; also the values included for mineral, water and riparian rights at St. Ignace, Marquette City and County and Houghton, and the values claimed for trackage rights at Marquette and Negaunee.

(b) Item 3, Grading. Defendants will not contest the quantities of grading as found by the Master, but will insist that the proper price

therefor was 25 cents per cubic yard.

(c) Item 6, Ties. Defendants will contend that for this item the price allowed by the Master was too high, and the percentage of de-

preciation insufficient to represent actual condition.

(d) Items 10, Ballast, and 11, Track Laying and Surfacing. Defendants will contend that these items should have been reduced by the Master to their depreciated condition, and that their actual condition is less than their replacement cost.

(e) Items 29, Engineering on Roadway and Structures, and 35, Engineering on Equipment. Defendants will insist that the item of \$255,000, allowed by the Master for Engineering on Roadway and Structures is sufficient to cover the entire cost of engineering, and

that the item of Engineering on Equipment is improper for that reason, and for the reasons that it does not represent actual expenditure or cost to the plaintiff out of capital funds,

and that the amount allowed therefor is an estimate only.

(f) Items 37, Contingencies; 38, Legal Expenses during Construction; 39, Organization and Administration; 40, Interest during Construction; 40, Taxes during Construction; and the item Appreciation, will be contested as improper and excessive as included in the cost of reproduction by the Master.

(g) Items 42, Stores and Supplies, and 43, Working Capital, will be claimed to be excessive in that the amount of \$272,811 allowed by the Master for Stores and Supplies is sufficient to cover both the items, and that there is, for that and other reasons, no propriety in the al-

lowance made for Working Capital.

(h) Item 34, Ferries and Steamships, will be claimed to be improperly included in plaintiff's cost of reproduction for the purposes of this case, unless the net earnings from passengers thereover are also included.

(i) The additions to property made after June 30, 1913, will be claimed to be as set forth in plaintiff's reports to the State
 Railroad Commission, and as included and added in defend-

ants' exhibits.

(j) This specification is not intended to admit the propriety of the cost-of-reproduction method of ascertaining the value of the property, but defendants will claim that the property is worth less, and that the plaintiff can only claim a return upon an amount less than the cost of reproduction affected by depreciation.

(k) So far as property has been created out of, or charged to, operating expenses, and not to capital account, the plaintiff should have shown the fact and defendants will object to the propriety of its in-

clusion in fixing value for rate-testing purposes.

(1) The south line, Marquette to Winthrop Jct., will be claimed

to have been improperly included in the cost of reproduction of the property used in the passenger business, on the theory that that line is required only because of the ore business, was purchased to retire competition, would not have been constructed for the purposes of the passenger business, and is not necessary for the proper conduct thereof.

(2) Defendants will not question the allocations of property to services, freight, passenger and common, but will claim that the methods pursued by the Master and by the District Court for dividing the common property between services—freight and passenger, and interstate and intrastate passenger—has not been established by the

evidence and are improper.

(3) Defendants will claim that the passenger revenues over the Mackinaw Transportation Company property must be in-

cluded as passenger revenues in this proceeding.

(4) Defendants will make no objection to the witness Delf's and the Master's allocations of expenses to (a) exclusive freight, (b) exclusive passenger, and (c) common to freight and passenger services, except that they will claim:

(a) That the setting off of expenses of the maintenance of exclusive freight trackage, as done by the Master and by the witness, Delf, do not constitute allocations and are improper in that insufficient amounts are set off to represent the actual cost of maintenance of such

exclusive freight trackage.

(b) That the items of expense, Station Employees and Station Supplies and Expenses, as divided between freight, passenger and common, do not constitute allocations, and that the divisions are

made on improper bases.

(5) All questions as to the division of common property and common expenses between freight and passenger services, and of common passenger property and expenses between interstate and intrastate passenger business, and of the common passenger expenses between passengers and baggage on the one hand and sleepers, diners, mail and express on the other hand, are reserved, and the methods of the witness, Delf, the Master and the District Court, are claimed to be unsupported by the evidence, arbitrary, general, conjectural, insufficient and improper.

(6) The losses or deficiencies in net earnings, if any, are and will be claimed to be the result of the freight, the ore, the interstate passenger, and the sleeper, diner, mail and express business, collectively or separately, and not the result of the intractate passenger business

in whole or in part.

(7) The loss or deficiency in net earnings, if any, will be claimed to result on, or to be materially contributed to by, the Western Division (Nestoria to the State Line), which, upon a proper analysis and separation of accounts, may show losses due to comparatively high maintenance costs and sparseness of traffic, and it will be claimed that, as that line was created for, and is principally engaged in, in terstate service, the proofs should have been made so as to permit a

separation of the income and expenses on that division, in

7 order to permit a determination of whether the loss or deficiency in net earnings, if any, was not in fact entirely due to

the interstate traffic carried on over that division.

(8) The claim will be made that plaintiff has not overcome the presumptions in favor of the validity of a rate-fixing statute, and that its proofs are insufficient to establish or to furnish a basis for proper divisions of property or expenses between services, and insufficient to permit a conclusion with reasonable certainty of the cost and net return upon the intrastate passenger business carried at the statutory rates; that such proofs do not meet the requirements of the Minnesota and associated rate cases, and that too much is left to conjecture, opinion and inference, and the general judgment of witnesses, without the keeping of accounts which might and should have been kept to show with reasonable approximation the exact conditions.

(9) All questions relating to following subjects are reserved:
(a) Income due to unearned increment or value increases.

(b) Amounts included in the sperating expenses of particular years, which represented expenditures for additions and betterments or to make good past depreciation or for deferred maintenance.

(c) The application and propriety of the claimed increased prices of labor, materials and construction, and equipment

items, of 1917.

(d) The presumptions applicable to, and the certainty required by the proofs of the plaintiff in, a rate case, and the sufficiency of the proofs made.

(e) Whether the rates should be or should have been, given an

experimental test before restrained.

(f) The propriety of deducting an assumed loss claimed to be due to the decreased rate, without experimental test and without proof.

(g) The propriety of the revenue train mile basis or any modification thereof, the gross ton mile basis, the time and ton mile basis, the direct costs basis, or any other basis, for the division of common expenses between services.

(h) The comparative cost of carrying passengers in interstate and intrastate services, and the comparative cost of carrying passengers in

sleepers and in ordinary coaches.

(i) The inclusion of costs of lands for minerals, special adaptation

and water and trackage rights.

(j) The effect of land grants and of the contributions of a portion of the property by the public.

(k) Original cost of investment, or commercial value, as opposed

to cost of reproduction, less depreciation.

(1) The rate of return which a utility is entitled to earn.(m) The exclusion of operations over, and operating ex-

penses upon account of, the Mineral Range.

(n) The separation to states of property located in one state, but serving the business of the entire line, as well as the expenses incident thereto.

(10) All questions not expressly waived are intended to be reserved. Testimony Before the Special Master.

On July 8, 1912.

HENRY EARLE RIGGS, a witness called by plaintiff.

Direct examination.

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By Mr. Butler:

I live in Ann Arbor, Michigan. I am a Civil Engineer. I was graduated from the University of Kansas in 1886 with the degree of Bachelor of Arts, and have received the degree of Civil Engineer from the University of Michigan. In 1886, I entered the service of the Burlington & Missouri River Railway in Nebraska, on construction. In 1887, I went into the service of the Atchison, Topeka & Santa Fe Railway, on construction, and in 1888 was transferred to maintenance of way. In 1890, I was appointed Chief Engineer of the Toledo, Ann Arbor & North Michigan, now the Ann Arbor Railway, and remained in that capacity until 1896, when I formed a partnership with Mr. W. J. Sherman, Chief Engineer of the Wheeling & Lake Erie Railway, for the private practice of engineering, which partnership continued until this year, when I became Professor of Civil Engineering at the University of Michigan.

I have given special attention to the subject of the appraisal or valuation of railroads and other public service properties. In 1900, I was appointed by Prof. M. E. Cooley, appraiser of railways for the Michigan State Tax Commission, to take charge of the civil engineering section of that work, and was a principal assistant from start to finish, and on the subsequent work of Prof. Cooley in 1903, and

also in 1906, for the State, I had the same position.

I have been employed in appraisal work by Spitzer & Company, bankers and bond dealers, since 1904, and have done all the work of that firm, making a number of appraisals, among which were the

Consolidated Power Company of Vermont, the Jackson & Battle Creek Electric Railway and Water Works plants, at San Antonio, Texas, San Angelo, Texas, Canyon City, Colorado, and a number of other water-works, gas and electric companies.

In 1910, I was employed by the Edison Sault Electric Company to make an appraisal of its physical properties at Sault Ste. Marie, in connection with the condemnation suit by the United States Government.

In 1909, I was employed by the Manhattan Trust Co. of New York, in connection with the Central of Georgia Railroad Co. income bond suits, and made a valuation of that property in the states of Georgia and Alabama.

In 1910, I was employed to make an examination of the property and the construction accounts of the Buffalo, Rochester & Pittsburgh Railway, and spent some months on that work.

I have made valuations of the street railway properties at Savan-

rah, Georgia, for the City of Savannah, in connection with a rate case, and at Atlanta, Georgia, for the Georgia Railroad Commission,

I have been employed with Prof. Henry C. Adams, on valuations of electric power properties in Michigan for the Railroad Commission, and by the Railway Commission of Georgia on the same class of property in Georgia.

For the last six years, my practice has been almost exclusively in connection with valuation work, and I have given but little attention

to construction or design.

I had charge, in 1900, and in all subsequent valuations under Prof.

Cooley, of the civil engineering work, the roadways, structures,
right of way, and all of the property and structures of the railroads, except the motive power, rolling stock, shop machinery
and tools, telegraph and telephone, and I had charge of the office
organization, the preparation of the reports and compilation of final
figures.

The appraisal of 1900 included the property of the Duluth, South Shore and Atlantic Railway Co., and all other railways in the State. My personal connection with the 1900 work was supervisory in the main; I saw part of the mileage in the Lower Peninsula, and during

that work was not personally on the lines of the Plaintiff.

The property was inspected under my direction, by experienced railway engineers, being divided, as I now recollect, into several inspection divisions, the work being done by two or three different men.

The work of 1903, under Prof. Cooley, was revision of the 1900 appraisal, in which no complete inspection of any of the properties, and no personal inspection of the Upper Peninsula property, was made. The appraisal of 1900 was taken as a basis. Certain changes in unit prices were made, to take care of the difference in cost of material and labor between 1900 and 1903, and the additions and betterments to the property as reported to the Railroad Commission were added to the former appraisal, and a considerable investigation in regard to right of way values was made in the Lower Peninsula, especially on the Michigan Central Railroad, and, based upon those investigations, quite considerable changes in real estate and right of way valuations were made as applied to the Lower Peninsula roads. No such investigations were made in the Upper Peninsula.

I have now made appraisal of the D. S. S. & A. property as of June 30, 1911, commencing with force of men about Aug. 15, 1911;

procured complete inventories and inspected property, going over all the lines once and parts of the line 2 or 3 times, spending 2 or 3 weeks at Marquette. There, from early Sept. until late Dec., I was engaged in necessary correspondence, checking and securing additional information to get complete data on which to base figures. Actual computations were completed before Jan. 1, 1912, and reports made to counsel, about Jan. 15, of the completed appraisal.

Book, marked Complt.'s Ex. 1, Riggs, is my appraisal of South Shore property. Sheet 1 is summary embracing value of the property of the system, except Minnesota. This shows 43 classes of items; I have followed this classification throughout. Pages 2 and 3 are a summary by items of the valuation of the property in Michigan; the

details follow to page 301. Page 4 is a mileage summary, main and bra-ch lines. Have varied Cooley schedules, introducing item 16, side tracks, which includes all items of material and labor for side

tracks.

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Sheet 4 gives in detail the tracks included in various schedules other than 16, showing (a) main track, (b) second track, and (c) Page 5 shows map of D., S. S. & A., being same as first rage of condensed profile. (Condensed profile marked Complt.'s

Ex. 2. Riggs.)

In making appraisal, I had Complt.'s Ex. 2, Riggs, which indicated In making calculation, I used original recballast and rail record. olds, checking them against the profiles. On Complt.'s Ex. 2, the nack and rail record showing ballast and rails is brought to January 1, 1912. Complt.'s Ex. 2 gives maps and profiles of main line and principal branches, but not of minor branches, as branches to mining properties, short lines like Bessemer Branch, and other 1 and 2 mile lines or side tracks or minor spurs. All lines given on page 4, Complt.'s Ex. 1, as main track, but none of track listed as

branches, appear on Complt.'s Ex. 2. Page 6 of Complt.'s Ex. 1 is a general map of the Soo. All of the property shown here is, in effect, jointly owned by

South Shore and Soo lines, each having one-half interest in the whole, through a 99 year lease. I have considered the properties at Soo, treated in appraisal as joint, irrespective of title.

Page 7, Complt.'s Ex. 1, and following pages, show detail of estimate of cost of reproduction of right of way, including expense of purchase and condemnation, abstracts, fees and commissions, a total

of \$2,221,923, excluding Soo Bridge right of way.

(The following is a comparison of Riggs, 1911, and Hansel, 1912, figures on schedule 1, Right of Way and Station Grounds: Hansel, value new \$1,370,883; present condition 100%; present value \$1,-370,883; under Riggs, \$851,040. Riggs value new \$2,221,923; pres-

ent condition 100%; present value \$2,221,923.)

(Subject to correction, stipulated, Soo Union Depot Co. is a corporation, one-half its stock being owned by Soo Line (M., St. P. & S. S. M.) and one-half by plaintiff.) Each of these companies has title to certain of the terminal property at Sault Ste. Marie, and each has given to the other a 99-year lease of an undivided half of its respective property.

The first description of 13 plus acres of Soo Union Depot Co., has upon it the depot and terminal structures, and is devoted to railway

terminal use.

The term "real estate" in the schedule means the bare land.

Seven or eight months previous to this appraisal, I made an appraisal of property of Electric Company, taken over by Government, at Soo. In that connection, I spent nearly three 16 weeks at Soo, going over entire railroad line in city limits a dozen or 15 times, becoming very familiar with company property there.

I arrived at the figures in Soo, as well as for most of the property of company outside of Marquette, by placing on the different pieces of property my own estimate of value, based on general knowledge of values at the Soo secured in connection with previous valuation and recent inspection, and affected to a considerable extent by inquiries made by me while on inspection trip as to general and specific values; with examination of the maps, taking all these things into account, I placed these values as representing my best judgment of the value of the property for railroad purposes, taking into account all of the elements of cost of acquiring, the value of the land, and the damages on account of severance. That general statement would apply to all the right of way values at Marquette, where I used a somewhat different method.

(Witness separated by descriptions and reference to page 6, Complt.'s Ex. 1, land owned by the two companies, South Shore land being 80.42 acres and Soo line land being 84.31 acres.) All riparian rights and all the property fronting on the harbor are owned by

South Shore.

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(Complt.'s Ex. 3, Riggs' map of Soo yard, scale 150 feet to inch.) On this Exhibit, green boundary lines show union depot property, red boundary lines show South Shore property and yellow boundary lines show Soo Company property; ail are jointly used. Of Union Depot Co. property one-half was assigned to complainant. Assuming that property not now devoted to railroad use, but privately owned, I

don't believe it would be possible to acquire it for less than \$100,000. Under some circumstances, I don't believe the property under item 2 (a and b) could be acquired today for

less than \$350,000 to \$400,000.

Page 8, Complt.'s Ex. 1, right of way and station grounds, Sault Ste. Marie to Soo Junction, or county line, including all in Chippewa

County outside Soo.

General width of right of way is 100 feet; in a few places it is 63 or 80 feet, and in a few it is 50 extra feet at small stations; in most of the counties it is 100 feet. In right of way 100 feet wide, there is approximately 12 acres to a mile.

Sault Ste. Marie to the county line, right of way uniformly 100 feet, except 1.5 miles, 150 feet, and 5 miles, 75 feet; acreage indicated,

page 8, computed from right of way maps.

I am able to form an opinion as to the relation of cost of acquisisition of rural or county right of way of South Shore, with acreage or land value by forties, or other convenient agricultural tracts through which it runs, assuming the railroad right of way not now used for that purpose, but to be acquired by purchase or condemnation proceedings for a railroad. I could express a relation as to the average of all country lands, outside of the territory in Marquette county affected by mineral rights, known or prospective.

I should say that in acquiring a right of way for a new railroad through these lands, assuming the present railroad to be obliterated, it would be necessary to pay as a consideration to the owners of the lands from two and one half to three times the market value of the

land considered in tracts of such size as are usually sold, say 40 acres, which consideration would include the lands and the severance damages, and in addition to such figures it would be

necessary to add the cost of acquiring the property and looking up the title, the services and expenses of right of way agents, attorneys, abstractors, and other expenses necessarily incurred in the acquisition of the lands. In answer, I excluded Marquette county; the relation, 2.5 to 3 times, is the average relation.

In Chippewa County, the railroad line does not in any instance follow section lines, but runs angling across the sections or parallel with section lines at some distance away. On, perhaps, not over 10 or 12 miles in Michigan is the road on section or quarter section lines.

I assumed the railroad not in existence at its present place, but that the country along right of way was developed in other respects, as now. The timber has been cleared off the right of way, and it is generally grubbed; in better condition than almost any line in Upper, or upper part of Lower, Peninsulas, through similar country. sumed 85% of main line mileage now timbered, in some form or The general practice in the Upper Peninsula is to place a Land prices range, on price on land, plus estimated timber value. uncleared lands, \$7 or \$8 per acre plus timber value, from a minimum of \$10 or \$12 to a maximum of \$50 or \$60 per acre. In makins calculations, I assumed the land to be acquired as right of way in the same condition as the abutting land.

I include in appraisal the acreage price for clearing, grubbing, etc., assuming land covered with same kind of timber as adjacent land, and that it would be necessary in buying the land to pay for the timber, and also to clear and grub to construct the railroad.

If timber was on abutting land, I assumed it to be on right of

19 way, also, and that it would have to be paid for. I did not take into account value of timber to railroad company for sale or use in building, as it would have no practical value; the cost of cutting, saving the timber and putting in shape for use would be too great. I know a few instances where that was attempted, but none where it was continued, because of increased expense of railroad construction. It would not be practical to make ties from tie timber on right of way.

The figure per acre set down by me is, I believe, conservative and a reasonable figure for cost of acquiring the land, taking into account all the elements and assuming it to be in the condition of abutting lands through which the line runs. I do not believe it would be possible to make a contract to purchase the right of way for the figure I

have named; I think my figures are pretty low, generally.

I am familiar with appraisal of lands in 1900 state appraisal; Soo Union Depot Co. Terminal was constructed, and land for it acquired, since 1900. I appraised at Soo, to both companies, 164.31 acres at \$304,042; one-half assigned to South Shore. Cooley appraised to South Shore there 84.88 acres at \$118,832. My appraisal included South Shore there 84.88 acres at \$118,832. Union Depot Co. property, and value placed was 28% more than Cooley's, which excluded that property.

(Map. Complt.'s Ex. 3, Riggs, and page 7, Ex. 1, show correction of statement of ownership, as between Soo Line and South Shore, on certain description.) This would not affect my figures, as I assigned one-half of all to each. I did not assume severance damages on terminal lands, at Soo or elsewhere, in any considerable amount; there would be practically none at Soo, as most of the lands have been acquired by tracts, and where entire tract not acquired, remainder is left in such shape that there would be no damage.

The severance damages, expressed by percentage, would be generally less in cities and terminals, by reason of the smaller tracts, although in a majority of instances the entire lot

or string of lots is acquired.

Mackinaw County and St. Ignace: (to extent that testimony is a duplication of Complt.'s Ex. 1, Riggs, it is not attempted to be repeated.) The right of way through town, valued at \$5 per foot,—\$21,000,—is made up of narrow widths, some town lots in whole or part, some narrow right of way and some wider tracts. The line runs immediately adjacent to the business houses on Main St., and in close proximity to a number of residences. I placed those values without consultation. Have been in St. Ignace 3 or 4 times since, and am satisfied that the figures are too low, and that the property would not be acquired for that figure.

I do not think \$50,000, excluding gravel pit, as placed in St. Ignace, is far out of the way for a value, exclusive of severance damages, which, by reason of the way town is built along railroad, would be very high. From observation since appraisal, I am satisfied my figures are low, 50 to 100%, and that they ought to be increased.

(Complt.'s Ex. 4, Riggs, map of St. Ignace, scale 200 feet to inch.)

Page 13, Complt.'s Ex. 1, Riggs, country land, Marquette county, to mile post 150. It is practically all timbered land. Item right of way, mile post 150 to 152, less than 100 feet in width, 15.5 acres, at \$50 per acre. That is right of way of varying widths; some of it is quite narrow, in quite a narrow strip or shelf of land between the bluff and the lake. The price I placed, I am satisfied, is far too low. Assuming the removal of the railroad and restoration of the land to original tracts, it would be extremely difficult to secure a right of way in this narrow strip of level land, that is

specially fitted for railroad purposes, and good land under cultivation; there are a number of dwelling houses all the way through it, and I am satisfied it would be extremely difficult to reproduce that few miles. From mile post 150 to where the track enters Lake St., Marquette, the right of way is located in a narrow strip varying from 200 to 400 feet wide, between the lake and hills, which is substantially level; there is no other outlet to the east of Marquette, for a railroad.

The strip gets narrower as the line goes west to the point where the strip runs out in the water front of Marquette. The M. & S. E. is also in that pass, being the only other road going east from Marquette. It is not practical for the city to be entered from the east, as by a railroad built with such grades as could be operated to take any other route except at a tremendous increase cost, over any other

route.

(Complt.'s Ex. 5, Riggs, map of Marquette and vicinity, scale 2000 feet to inch.)

The three items, Complt.'s Ex. 1, page 13, Marquette county line to point where track enters Lake St., I don't believe could be reproduced under those conditions for less than \$20,000 to \$25,000.

(Complt.'s Ex. 6, Riggs, map of Marquette, 300 feet to inch.)

Item, water front, Burt & Ely's Add., 1,100 feet, at \$35, \$38,-500. This strip is 50 to 80 feet wide, from water front back, lying between Lake St. and the lake.

Item, water front, inside Marquette harbor, 2,200 feet, at \$75, \$165,000; that is water front from opposite the end of Jackson St. to opposite the end of Washington St., on which is located ore,

merchandise and coal docks of company.

I don't believe that, assuming the two properties not now 22 used for railroad purposes, but vacant and unimproved, they could be acquired for less than \$200,000 to \$210,000. I placed my estimate at a uniform price per foot, and did not undertake to separate into small tracts; probably some of the property in the first description might be acquired for less than the sum named. I am of the opinion that part of the main water front is much more valuable, and I don't believe that the two tracts of water front taken as a whole, can be acquired for less than the figure named in my appraisal. I consider that to be the fair present value.

Item, water front, outside harbor, south of south line of Ely lot,

850 feet, at \$30 per foot, \$25,500.

Item 4, frontage west side of Lake St., north line of Ely lot to Jackson St., 1,000 feet, at \$60 per foot, \$60,000.

In my opinion, that property is worth \$50 a front foot on Lake St., on account of its depth and location.

Item 5, page 13, frontage, west side of Lake St., north line of

Ely lot to Baraga Ave., 1,110 feet, at \$30 per foot, \$33,300.

A lower valuation was placed by reason of shallower depth. last two items were valued in Cooley appraisal at \$71,740, being \$34 a foot, while my aggregate is \$93,300. I don't believe it could be acquired for less than I have named, but it might be worth more.

Item 6, page 13, frontage, west side of Lake St., Jackson to Mesnard, 565 feet, at \$20 per foot, \$11,300. The fair and reasonable value of that property, excluding improvements, is not less

than \$20 a front foot on the lake.

Item 8, page 13, 46 50-foot lots between Mesnard & Hamp-23 ton streets, at \$100 per lot, \$4,600. I don't believe it would be possible to acquire those lots for less than \$100 to \$150 each, and believe their fair value not less than that.

Item 9, page 13, 12 50-foot lots west of Division, at Hampton, at \$200 per lot, \$2,400. Worth not less than \$2400.

Item 10, page 13, 121/2 50-foot lots, Jackson to Mesnard at \$400

per lot, \$5000. Worth not less than \$5000.

Item 11, page 13, 336 feet frontage on Lake St., Baraga Ave. to Washington St., at \$50 per foot, \$16,800. Worth not less than \$50 per foot. Item 12, page 13, 343 feet frontage on Front St., Baraga Ave. to Washington St., at \$450 per foot, \$154,350. This covers end of Depot yard, two under crossing, and one over crossing. It is in the most valuable part of the principal business street of Marquette. I doubt whether it could be acquired for \$450 per foot, if privately owned and not devoted to public use.

Item 13, page 13, 184 feet frontage on Front St., south of Baraga Ave., at \$200 per foot, \$36,800. Worth not less than the figure

named.

Item 14, page 13, 445 feet frontage on Main St., Front to Third St. at \$60 per foot, \$26,700. Worth not less than the figure named.

Item 15, page 13, 14,608 square feet on Front St., 3rd. St. to
Washington and Main, at \$2 per square foot, \$29,216. Worth
not less than \$2 per square foot, and if privately owned I
don't think it could be acquired for that sum.

Item 15a, page 15, 100 feet frontage on Baraga Ave., at \$50 per foot, \$5,000. I don't believe that it could be reproduced for that, and the actual cost to the company was far in excess of that sum.

Item 16, page 15, 150 feet frontage on Spring St., at \$50 per foot, \$7,500. That is an item on which there is a very large measure of severance damages; it extends diagonally across lots 15, 16 and 17 of Block 3, and takes the front off 3 lots on opposite side of street. I don't believe it could be reproduced for less than \$7,500 to \$10,000, and believe that its value is no less.

Item 17, page 15, 21 lots, Third St. to Fifth St., at \$500 per lot, \$10,500. Value not less than \$10,500; probably would cost more

to purchase for railroad purposes.

Item 18, page 15, 60 lots and shop grounds, Fifth St. to Park Ave., at \$500 per lot, \$30,000. In my opinion, worth not less than \$30,000 for platting for other than railroad purposes; if railroad not there, do not believe it could be acquired for less than \$40,000 to \$50,000.

Item 19, page 15, unplatted lands south of Nester's Add. and west of the shops, 34 acres; estimate based on 6 lots per acre, at \$150 per

lot or \$900 per acre, \$30,000.

Item 20, page 15, south of Nester's Add. and west of the last above described tract, 36 acres, at \$1,000 per acre, \$36,000. Both these tracts are immediately adjacent to, and south of, a good residence part of the city; were the railroad not there, it is de-

sirable for platting. I placed a value of \$150 per lot on 34 acres, though I am satisfied it would be worth more than that for other than railroad purposes. Its being strategically in a valley, and its proximity to shops and other property of the railroad, make it especially desirable for railroad property, and I would consider it worth more than I have placed upon it for railroad purposes.

36 acre tract is generally the same kind of land; it is higher, lays better for platting, though more remote from center of city. I stated

\$1,000 per acre on the basis of value for platting.

Taking both parcels in 70 acre tract, if privately owned, vacant and unimproved, taking into account its situation and considerations of strategy referred to, I don't believe it could be acquired for less than \$1,200 to \$1,500 an acre in the tract.

Item 21, page 15, industrial sites at end of Dead River Railroad. in North Marquette, between L. S. & I. ore docks and iron works, 151.35 acres, at \$200 per acre, \$30,270. The next description is the right of way leading to this.

Item 22, page 15, Dead River railroad right of way, 30 acres outside of platted part of city, at \$200 per acre, \$6,000. Fair value not

less than \$200 per acre.

Item 23, page 15, right of way, north line to city limits, 6.8 acres, at \$200 per acre, \$1,360. Worth not less than \$200 per acre. The north line could not conveniently be placed on other land because of extremely heavy grades. If not now devoted to railroad uses, I don't believe it could be acquired for less; it might cost more.

Item 24, page 15, right of way, south line, Hampton St. to 26 mile post 1, 16 acres, at \$200, \$3,200. This right of way runs diagonally with respect to section lines. Worth not less than \$200 per acre, and I question whether it could be reproduced for that.

Item 25, page 15, right of way, north line, city limits of Marquette to limits of Negaunee, 79 acres, at \$150, \$11,850. Worth not less than \$150 per acre; the absolute title, such as plaintiff has, I don't think could, particularly in westerly end, be acquired at any price, because affected by mineral rights. At present, all the sales reserve the right to occupy the land and right to mine. The mining results in caving down the surface, and necessitates the removal of the railway tracks and structures. If possible to support the surface, it would entail such expense that no mining company would undertake it. As ore is removed, the surface of the ground caves. In 1910, Negaunee Mining Co., desiring to remove ore under right of way of South Shore, acquired a new right of way in fee, and built 2.1 miles of new railroad for plaintiff. That was a matter of bargain, as old South Shore right of way was perpetual. This was so mining company could cave in old route.

Item 26, page 15, right of way, south line, limits of Marquette to limits of Negaunee, 96 acres, at \$100 per acre, \$9,600. It is in mining district, but major part not so much protected by mineral The value not less than \$100 per acre, and very doubtful

in my opinion if it could be reproduced for that.

Item 3, page 13, water front, outside harbor, south of the south line of Ely lot, 850 feet, at \$30 per foot, \$25,500. Present value not less than \$30 per foot, measured along streets, parallel.

Items 1 to 26 inclusive, within Marquette, total appraisal, 27 Cooley 1900 appraisal did not include all the \$773,296. right of way or the 151 plus acres at North Marquette as in Marquette city. His total value in Marquette was \$597,777. Upon the same lands, my valuation is \$732,466, exceeding his by \$134,698, or approximately 22.5%.

In my opinion, land of plaintiff in Marquette city is worth not less than \$800,000 to \$850,000. If such land were not already devoted to railroad uses, but was vacant, privately-owned and unimproved, it could not be acquired by purchase or condemnation for

less than \$800,000 or \$850,000.

Item 27, page 15, city of Negaunee, north line, mile post 163 to mile post 164 plus, 2,800 feet new line, 2.6 miles, near Negaunee Mine, south line, mile post 9 to mile post 12. Total acreage, 86 acres, at \$2,500 per acre, \$215,000. My estimate of value was based on the assumption that company had perpetual right to maintain the tracks. Fair present value not less than \$215,000, or \$2,500 Practically the whole of this item is in minind district. underlaid with ore mines and immediately adjacent to improved mining property. If not now in railroad use, but vacant, unoccupied and unimproved, I don't believe the land could be secured at any price. I don't believe a perpetual right of way (without the fee) could be secured at a much greater cost than the \$2,500 per acre estimated.

I have made special inquiry as to amount paid for lands in vicinity of Ishpeming and Negaunee, and conditions surrounding the railroad lands there. I have been given access to information and actual cost of land acquired for railroad purposes there; have been over the territory several times, and have seen conditions that existed there on D. S. S. & A. and other railroad properties.

28 Item 28, page 15, in Negaunee City, to mile post 167 on main line, total acreage, 29 acres, at \$3,500 per acre, \$101,-Fair value of this description, without mineral, not less than \$3,500 per acre. If the land vacant, unoccupied and unimproved, in my opinion it would be impossible to acquire such rights as are now possessed by plaintiff for less than \$110,000 to \$150,000. This is all main line right of way.

Item 29, page 15, track rights in Negaunee, main line, 8,700 feet,

at \$5 per foot, \$43,500.

Item 30, page 15, branch, 7,300 feet, at \$1.50 per foot, \$10,950. Item 36, page 15, Winthrop Branch, 23 acres, at average of \$300 per acre, \$6,900. The acreage given is that owned on the entire branch. Most of the sidings and spurs are on lines of mining company, but most right of way on the branch itself is owned. I do not include right of way for branches, sidetracks or spurs upon the lands of others which are not owned. In sidetrack item, I have made no allowance for land upon which sidetrack is located, nor in item right of way do I include land in any case, where the track is located upon the lands of others.

(Complt.'s Ex. 8, Riggs, map of mining district, including Ishpeming and Negaunee.) This shows the location of the principal

mines and railroads of other companies.

Item 37, page 15, Mary Charlotte Branch, 3.2 acres, at \$100 per acre, \$320. My opinion is that it is worth at least price given.

Item 38, page 15, Palmer Branch, 34.4 acres, at \$100, \$3,140. Worth not less than price given. If vacant and unimproved, it would be impossible, at figure I have named, to acquire rights for permanent main line railroad. To acquire such rights as 29 usual for mining spurs would cost not less than amounts named for last three items, namely, Winthrop, Mary Charlotte and Palmer branches. By rights used for mining spurs I mean the right to lay a track subject to right of mining company to order removal

on short notice. That is not the condition of these lands; most of them are ownership of right of way. There are some grants su' ject to right of owners to have tracks removed, but not many.

Item 39, page 15, Ishpeming limits to mile post 173, 168 acres, at \$250 per acre, \$4,200. Company has fee simple title. Value not less than \$250 per acre; it would cost not less than that to acquire at present time if not used for railroad purposes and unimproved.

Item 40, page 15, mile post 173 to east end of Humboldt yard. 100.8 acres, at \$75 per acre, \$7,560. Worth not less than \$75 to \$100 per acre. That right of way would exceed in cost to purchase. if vacant, unoccupied and privately owned, \$100 per acre average, on account of mineral rights, character of soil and availability for agricultural purposes. As respects section lines, the line here is irregular, paralleling section line one-eighth to one-fourth mile distant and angling across one section.

Item 41, page 15, Humboldt, 18 acres, at \$500 per acre. \$9,000. I estimated 18 acres in use for railroad purposes, or so affected by location of railroad as to be useless for any other purpose and necessarily a part of right of way. \$500 an acre is my judgment of reasonable value, taking into account immediate proximity of mines

and its use as a railway junction.

(Complt.'s Ex. 9, Riggs, map of Champion.)

Item 42, page 16, Humboldt to Champion, 36 acres, at 30 \$40 per acre, \$1,440. The country is more or less affected by possible mineral deposits, with timber on much of it. I believe estimate of \$40 per acre radically low, and that it would be impossible to reproduce this right of way for any such figure, or less than \$50

to \$75 per acre, which is my opinion of its value.

Item 43, page 16, Champion (including branch), 18 acres, at \$350 per acre, \$6,300. Value of this 18 acres affected by fact that it is immedately adjacent to mining village and that all land through there is affected by known mineral rights. This right of way is perpetual, and fair present value is not less than \$350 per acre; impossible to reproduce through Champion for any such sum, but

would cost considerably in excess.

Item 44, page 16, Champion to Michigamme, and Michigamme to county line, 84 acres, at \$25 per acre, \$2,100. Main line from mile post 186 to 193.66, except strip between mile post 192 and 193, through village of Michigamme. For a distance of 2 or 3 miles east of Michigamme, the feasible railroad routes are limited to a strip of country 600 or 800 feet wide. I am convinced the \$25 per acre is too low, and that the property could not be reproduced for less than \$75 to \$100, on the average; that item ought to be increased to extent indicated.

Item 45, page 16, Michigamme, 8 acres, at \$350 per acre, \$2,800 between mile posts 192 and 193. My appraisal influenced by the fact that Michigamme is on both sides of road, which at that point is along shore of one of the most beautiful lakes in Upper Peninsula, and by mining developments at Michigamme. Because right of

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way is near lake shore, it is of greater value than otherwise.

Worth not less than \$350 per acre, and if railroad were not there, and it were vacant and unimproved, that would be fair

purchase or condemnation price.

Item 46, page 16, Republic Branch, county land, 94 acres, at \$25, \$2,350. I am of opinion it could not be purchased at \$25 per acre fixed, but do not know of extent to which lands, Humboldt to Republic, are affected by mineral values. There are mines at both ends of branch.

Item 47, page 16, in Republic village, 8 acres, at \$1000 per acre, \$8,000. The value is not less than \$8,000, and if vacant unoccupied and unimproved, it could not be acquired by purchase or condem-

nation for less.

When getting the land values of country lands through the state, the severance damage varies, making the cost to the railroad of right of way lands from two to four, or more times the sales value of the land for other purposes. That was recognized in the Cooley appraisal for taxation.

In the Cooley appraisal, the multiple used was two or three times the market value for other purposes, as a basis, and to this figure was added a fixed charge of so much per acre to cover cost of acquisition and investigation of title. In my opinion, from two to four and a half times should be added. In my profession, it is a recognized practice to use such a multiplier. The general practice in valuation has been to use a multiplier varying from two to three and a half, and in Wisconsin and Minnesota these multipliers have been from two and a half to three and a half intending the figures to be approximate. The practice was first used by Professor Cooley, in 1900 valuation.

Item 55, page 15, Houghton Terminal, 12 acres, 1,550 feet, of water front, with riparian rights, ranging in depth from 150 to 350 feet; 1,500 feet, at \$35 per foot, \$52,500. The land, with the exception of a strip along the line furthest away from the water's edge, is level. There is a bench between the foot of the bluff and the lake. The question of strategy was not especially taken into account. It is the only possible entrance for a railroad line into Houghton from south. I don't know about going into Houghton from the west, along Portage Lake. The fair value, in my judgment, is not less than \$35 per foot, and possible much more for

any commercial purpose.

Item 56, page 16, first mile out of Houghton yard, along shore of Portage Lake, at foot of bluff, below State School of Mines, and residence district. 12.8 acres, at \$2,500 per acre, \$32,000. All of the land on this mile available for right of way purposes is confined to a narrow strip of which this is a part, at some places not to exceed 150 feet wide, and in no place over 250. Fair present value based on reproduction, not less than \$2,500 per acre. Assuming that the land were privately owned, it could not be acquired for less than \$50,000. This item and the last preceding could not be reproduced for \$85,000 and possibly exceeding \$110,000.

Item 29, page 15, track rights in Negaunee, main line, 8,700 feet,

at \$5 per foot, \$43,500. Corrected to 8,710 feet. I reached valuation of \$5 a foot on theory that it would be impossible to secure a lease or grant to maintain a single track through the same territory for less. I regard track right as equivalent of independent ownership of the right to build and maintain one track. Item 30, page 15, 7,300 feet, Teal Lake Branch, at \$1.50 per foot, \$10,950.

Item 31, page 15, track right to Milwaukee Mine, 9,120 feet, between Negaunee and Ishpeming, at \$1.50 a foot,

\$13,680.

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Item 35a, page 16, 1,000 feet main line, title by prescription omitted, 1.52 acres, at \$3,500 per acre, \$5,320. (Added in Ex. 50, Riggs.)

Item 32, page 16, south line, 12.77 acres, at \$1,000 per acre,

\$12.770.

Item 33, page 16, city of Ishpeming, south line, in city, 38.2 acres,

at \$2,500 per acre, \$95,500.

Item 34, page 16, north line eastern part of city, 9.6 acres, at \$3,000 per acre, \$28,800; western part of city, 7.7 acres, at \$3,500, \$26,950.

Item 35, page 16, through central part of city, narrow right of way. Track right and extra lots 5,000 lineal feet of track, estimated

at \$30 per track foot, \$150,000.

If items 29 to 35 were privately owned, vacant and unimproved, it would be impossible to acquire rights to get such tracks and lands as the company has through that territory for less than \$150,000, and possibly very much in excess of that.

(Witness produced copy of Cooley 1900 appraisal, and makes the following comparisons of land values:)

34 - 35

County.	Riggs.	Cooley.
Alger	\$18,838	\$2,539
Baraga	131,062	27,495
Chippewa	211,082	120,421
Gogebie	34,300	1,766
Houghton	133,600	46,067
Luce	24,173	6,695
Mackinaw	64,551	13,034
Marquette	1,541,927	677,848
Ontonagon	53,880	2,184
Schooleraft	8,510	1,799
Total		\$899.848

The Cooley appraisal showed 274.17 acres of farm land for plaintiff, at average of \$26.16 per acre, and 4,623.2 acres barren land at \$2.50 per acre, and 268 acres in cities and villages at average of \$182.29 per acre. In Ishpeming and Negaunee, Cooley's value was \$71,067, as against mine of over \$667,000.

(Abstract from Cooley appraisal marked Complt.'s Ex. 11, Riggs.)

Schedule 3, Grading, Complt.'s Ex. 1, Riggs, page 2. The details are found on pages 33-36 of Ex. 1. This item includes clearing, grubbing, grading channels, shrinkage, overhaul, corduroy, construction, retaining walls, rip rap and sea walls, \$2.879.484.

36-42 Nothing included for grading, clearing or grubbing sidetracks, which is included in item of sidetracks. Have followed I. C. C. classification of construction accounts in general, except that I have introduced new schedule, "Sidetracks," in which is

included all cost of sidetracks at a price per running foot.

In computing 1911 earthwork yardage, I used as my basis the 1900 appraisal figures, checking against profiles in several instances and making full notes on inspection trip for classification of earth and other materials. The 1900 earthwork yardage arrived at by engineers inspecting the road, profiles, maps and records; this done under my direction. Computations were made, 1900, of earth yardage as taken from profiles. I have found these computations substantially correct. In 1900, there were no allowances in addition to bare profile quantities. Since 1900, there have been changes in mileage.

An increase of yardage is made due to bridges, trestles and open cattle guards filled and small work widening fills. In Cooley appraisal the Republic Branch was omitted from grading. Cooley appraisal makes no allowance for solid rock excavation, Michigamme to state line, and not sufficient allowance for rock, Michigamme to

Marquette.

Page 4 of Complt.'s Ex. 1 shows the mileage taken into account in grading, on pages 33-36. I accepted the total yardage of Cooley appraisal as starting point; there, there was no allowances made in addition to profile quantities for shrinkage, for which it is customary to add 10% to care for settlement of fills. I added 10% for shrinkage, to take care of settlement and error due to the absence of actual cross-section notes and use of profile measurements.

There are only two classifications in Cooley appraisal, solid rock and earth. I have divided loose rock and hard pan and re-divided Cooley quantities among the four. Shrinkage added is 10% of all yardage; that is, yardage of pay earth, and not combined yardage of all cuts and fills. Overhaul added; the free haul distance adopted by me was 600 feet; the customary distance varies from 500 to 700 feet.

Cooley appraisal allowed nothing in grading for overhaul, shrinkage, grading crossings and station grounds, etc., probably because of short time for work of appraisal; they were included for some roads. Considering the fact that Cooley appraisal was done in three months, it was a wonderful piece of work, but in many instances it contains omissions. I arrived at figures for overhaul, grading crossings, etc., by the use of a percentage, varying from 6 to 9, of the earth yardage, fixed by inspection and judgment.

In Cooley apraisal, I do find four items of loose rock; the Cooley appraisal included the jointly-owned mine tracks in Republic yards.

The yardage totals are given as follows:

14 District.	Yards.	Average per mile.
Soo to Marquette	2,063,010	13,410
Soo Junction to St. Ignace	449,722	10,466
Marquette to Houghton	2,732,596	21,640
Nestoria to state line	1,880,218	18,130
	7,125,546	16,690

The average of 16,690 yards would be equivalent to a 16 foot road-bed, 1.5 to 1 slope, level cross-section, 4 feet high. The yardage for embankment of various heights would be, 4 feet, 17,160 yards, 6 feet, 29,300 yards, and 8 feet, 44,000 yards, per mile. Generally, the embankments are full width; in many cases, especially in marshy or low ground, the banks are wider than standard, 16 feet. Cuts are also wider than standard, due to the fact that they have assumed the angle of repose and have been cleaned out, as the material sloughed down. Generally, the fills have been replenished and brought up to full standard width and have assumed, in the main, the angle of repose and become covered with a growth of grass.

From my observation, I have been able to form an opinion as to whether or not on the average the yardage in the road is as much as stated. This is independent of computations. My opinion is that a re-measurement and re-cross-section of the road would show actual

vardage per mile to be:

Soo to Marquette	14,000 t	o 15,000 yards.
Soo Junction to St. Ignace		. 12,000 yards.
Marquette to Houghton		. 25,000 yards.
Nestoria to state line		. 20,000 yards.

On an old road like this, it is not possible by inspection of the ground to ascertain the number of yards moved and put into the banks; at a number of points, there are soft ground and sink holes, or swamps, where the earth would settle and would not be discernable or capable of measurement. Approximately

be discernable of capable of measurement. Approximately 25 to 28 miles east of Marquette show evidence of having been corduroyed, which would naturally and normally settle. The records of plaintiff would not show what has been done by way of fills since road was built. The records are very incomplete as to work done between original construction and 1895, in putting on earth, raising fills or widening banks. The original construction records are on the profiles, which would not show the amounts of yardage paid for.

The unit price for grading was, in my judgment, fair and reasonable, and it would fairly and reasonably cost that amount to do the work at the present time, or last year. Cooley prices in 1900 were, 25¢ per cubic yard for earth grading, 60¢ for loose rock, and \$1.25 for solid rock. Wisconsin appraisal of 1908 uses the same figures as Cooley appraisal. Prices from other appraisals are as follows:

Appraisal.	Earth.	· Loose rock.	Solid rock.	Hard pan.
Minnesota Appraisal, by Morgan	27c.	50c.	\$1.20	
Cooley Appraisal, 1900	25c.	60c.	1.25	
State of Washington Railway Appraisal, by Gillette	25c.	50c.	1.10	42c.
Wisconsin Appraisal, 1908 Northern Pacific Appraisal, Minesota,	25c.	60c.		
by Darling	28c. 27.75c.	50e.	1.10	42c.
	to 31.5c.	55e.	1.25	45c.
D. S. S. & A. Construction, Branch and Sidetrack (1910)	22c. & 40c	75c.	1.35	50c.

The contract prices would be very materially affected by the local conditions surrounding the work, the ease with which a company could secure teams and men, whether the contractor who had 46 taken the work would have to ship his equipment a long way from settlements and board them himself. In Wisconsin, Michigan and Minnesota the prices would be about the same. In Wisconsin and Iowa, it would be easier to secure men; the element of shipment of the entire force a long distance to do the work does not come into the computation in Iowa, as in Michigan or Wisconsin, along South Shore. The local labor supply ought not to be a great factor in these states, except in team work; the local supply of teams would affect the conditions of railroad construction.

There has been a general increase in labor prices of about 15% between 1900 and 1911, and an increase in materials ranging from 5% to 100% on timber of various kinds; 1911 and 1912 prices are somewhat lower than 1909 and 1910, but the general tendency is upward. When prices went down in 1909 and 1910, they did not go as low as they had been in previous years. The inventory of schedule 3 is, according to my best opinion and judgment, true, correct, and as complete as I can make it, and the cost of reproduction as of June

30, 1911, or 1912, would be not less than \$2,879,484.

Failure to depreciate earthwork and grading is due to the fact that the work is worth as much as cost to produce, new, a like structure. The cuts and fills on this road are in a condition today of absolute stability due to settlement, due to the fact that all of the erosion by water, and various other forms of sloughing and settlement that will take place, have taken place, and that many, or I may say most, of the embankments and slopes of cuts have become sodded over. The roadbed of plaintiff is in very much better condition today than a new, green, unseasoned roadbed would be. There will be no settlement, and the expense of maintenance is very materially less on an old, well seasoned roadbed that has become thoroughly

adapted to conditions of drainage that are formed or created by the construction of roadbed. In my judgment, the cost of track maintenance would be increased, on an average, by the addition of two or more men per section for the first six or seven years, to take care of the work of cleaning out of cuts and of replacing earth around embankments that had sunk down or been washed away.

I used the prices and information I secured in the offices here as

an aid in arriving at fair unit prices to apply to a general reproduction estimate. In many instances, prices paid for small quantities of material were considerably in excess of my unit prices; this is true, also, in the matter of labor contracts for grading, rock and loose

rock.

Schedule 6, Ties, Complt.'s Ex. 1, Riggs, pages 144 to 146. The average life of ties in this territory is: Cedar, 10 to 12 or 13 years, tamarack, 9 to 10 years, hemlock, 8 to 9 years, and oak, 8 to 10 years. Some years, the conditions of work will be such on the road that renewals that can be left are allowed to run for a year, and renewals the following year will be heavy. Sometimes this deferred maintenance will run two or three years, with only necessary renewals, and then larger renewals will be made. Generally speaking, tie renewals are above normal from year to year, and from one-eighth to one-tenth of the main line ties will be renewed each year, depending on the kind of ties, and the local conditions.

I found that the company had made tie purchases for 11 years ending June 30, 1911, as follows: 279,316 cedar, 921,160 hemlock, 341,649 tamarack, 111 oak, 582, pine, 1,688 ash and 70,846

culls.

I have applied a present condition of 60%, throughout, as being representative of the present condition of the ties, as

compared with new ties.

Ballast, including cost of material, loading, transportation, unloading and placing in track of ballast for main line, \$646,898; present physical value, the same amount.

Q. While we are on the subject, does ballast depreciate in condi-

A. If a road is ballasted and no further work of ballasting is done upon it for many years, I would answer your question yes, but if, as is the usual railroad practice, the ballast is renewed from time to time, additional ballast being placed upon it, the amount of ballast under the track becomes very largely increased, the drainage improves from year to year, and the ballast, as far as the condition is concerned, remains at substantially 100% condition, and in my opinion this item should not be depreciated in the case of a road which is keeping up with the renewals of ballast and the addition to the quantity of ballast.

The fact is that the road is a well ballasted road; between Marquette and the Soo and St. Ignace, Marquette and Houghton, and from Nestoria to the state line, there is a large amount of ballast and considerable recent work has been done, but a year ago there was a considerable mileage between Nestoria and the state line that was in

need of additional ballast.

I should call the road a well ballasted road wherever gravel and sand has been applied; at other points, I have used the price of sand ballast.

In my opinion, the ballast that is now on the road in Michigan could not be reproduced for less than \$646,898, and that it is worth today that sum of money.

I do not believe it would be possible to reproduce the ballast that is on the road today, as it has been placed piece-meal, with most of the material loaded by hand and not by steam shovel, for anything

like the figure that I have estimated.

The item of track laying and surfacing has not been depreciated at all. I regarded the same as a labor item. I have treated this item and the ballast item in the matter of depreciation exactly upon the basis of Mr. Cooley in 1900, in that no depreciation was made, upon the ground that they were a cause of creating property, and as long as the property was in use and as long as large sums of money were annually spent for the maintaining of those elements—in the highest condition of efficiency, was the word I was hunting for—that it is not proper to figure a depreciation.

The Mackinaw Transportation Co., listed under schedule 34, Ferries and Steamships, is a corporation engaged in running a car ferry line between St. Ignace and Mackinaw City. One-third of the stock of this corporation is owned by the plaintiff and the other two-thirds by the Michigan Central and the Grand Rapids & Indiana. The company is not operated for profit, and each company pays an equal proportion of all the expenses connected with its operation. Its property consists of certain ferry boats, which are listed in the schedule,

and one-third of their value is assigned to plaintiff.

Engineering on roadway and structures, including salaries, expenses, supplies and transportation of engineers, inspectors and architects, and fees for inspection of material and machinery, fixed at 4% of items 1 to 28 inclusive; 4% on \$12,187,742 equals \$487,510. Fair present reproduction value and

the present physical value are the same.

There has been no allowance elsewhere covering cost of making plans, inspection or superintendence on any of the foregoing schedules. This work includes preliminary surveys, location of line, engineering on construction, and incidental inspection, plans, superintendence of construction, and inspection of bridges and other structures. This is item 1 in I. C. C. classification.

It is customary, and has been for many years, to include in all estimates of cost for new construction a percentage allowance to cover the item of engineering, and it has been customary and usual

in appraisal practice to make an allowance for engineering based upon a percentage of the roadway and structures items substantially in every appraisal, the same items that I have

included in this group, in arriving at this percentage.

In Cooley appraisal, the same percentage, applied to the same items, was used, except item 27, Electric Plants, new since Cooley appraisal. The 4% is an average; it might be very little on some items, and higher than 4% on others. The average was arrived at by making a careful study of the actual engineering percentages of work done under me and by me for the last 12 and 15 years, and comparing my own experience with the experience of other engineers, and by the use of a figure which I believe to be a fairly conservative one, to represent this expenditure.

I believe this is as accurate a way of getting at proper charge for engineering as to take each item separately at its own proper percentage, as it would be almost impossible to keep separate accounts of, or to compute a proper allowance for, engineering. For certain items—for example, in the roadbed item—there is a large amount of engineering that is not directly assignable to any one of the elements that go to make up that item; there is no way to accurately ascertain the engineering charge on any particular item, 1 to 28.

You must find out what the engineering of a railroad would amount to, and that includes not only the design and superintendence of your buildings and your bridges, but it also includes very large expenditures for preliminary surveys and for location surveys, and for soundings and borings and other work to determine the area of water ways and the character of foundations to be used; that cannot be definitely assigned to any of the items making up the cost of the

road. Ordinary engineering accounts are kept as engineering, and all of the elements on engineering expense are kept in one general account, and not assigned to any specific struc-

ture.

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The 4% is an estimate based upon the comparison of actual engineering percentages in a large number of cases. It represents my opinion; that figure represents the concensus of opinion of the engineering profession of the percentage as to the fair and reasonable allowance. The manner of the application of it is in accordance with engineering practice. The amount of the percentage varies considerably in construction estimates based upon the character of the construction that is about to be undertaken.

There is a decided concensus of opinion as to the propriety of using 4% on properties of this kind in valuation work, applied to the items to which I have applied this. The percentages used in construction estimates on railroad work vary from 4% to 7.5%, averag-

ing 5%.

Engineering on equipment, including all engineering salaries and expenses connected with the purchase or construction of equipment, fixed at two per cent of items 30 to 34 inclusive; 2% of \$2,946,193 equals a fair reproduction value of \$58,924; present physical value the same.

The item did not appear in any of the Cooley appraisal in Michigan. It was added because it represents an expense to the railroad in connection with the inspection, breaking in and testing of equipment. The 2% was placed after conference with Messrs. Saddler and Anderson and based upon their experience, and information

51 secured by Mr. Anderson and myself as to the value and cost of such work in connection with other railroads. In work in New York, last year, we were able to determine the exact cost of that

item, as far as locomotives were concerned.

There, the cost of preliminary engineering, specifications, inspection and cost of breaking in ran over 2%—almost 3%. My own experience permits me to state with positiveness only in the matter of steam shovel and other construction equipment, where I have known the cost to run from 1.5% to 3.5%. In such equipment, it is neces-

52

sary to pay for the time and expense of a man sent by the manufacturing company to assemble, test, put the machine in order and give it a trial run, which is additional to price paid by purchaser.

Locomotives are not fully assembled, and considerable work, in the way of assembling the various fittings, must be done; it is the practice on railroads to break in locomotives, taking, sometimes, several weeks. On freight cars, it would be less than on items of machinery. On passenger equipment, it would be in part due to minor equipment purchased for cars. On work equipment, my percentage is fair to represent bona fide expense, and would necessarily be expended in reproduction.

The item of contingencies is one that is added in all cases of valuation, to cover those elements of cost of construction that are not disclosed by the inventory of the property, and those elements that

are due to weather, strike and other causes that go to increase the cost of construction or add to the unit prices that have

been used in making up the appraisal estimate.

My percentage averages 7.9%. This item is, and has been for many years, customary in construction work, in the engineering profession. On ordinary construction work, involving all classes of road equipment and bridge work, percentages vary from 5% to 15%, and more, averaging fully 10% on all items. Engineering practices vary as to exactly how this should be added; some prefer to add a percentage to each item, varying from 5% to 20%, and some prefer to add

en average percentage to the entire estimate.

Where percentage is applied to each item, there should be a general smaller percentage applied to undertaking as a whole, to cover elements of cost not covered in specific items. Contingency item is to cover unforeseen things or errors in inventory, and includes casualties, personal injuries, and loss by fire, flood and cyclone. In a property in existence for a number of years, it is difficult to procure accurate inventories, especially of masonry and concrete, yardage of grading, and other elements that go to make the completed property. The percentage is added, on the assumption that the estimate is always under. In practically every estimate of this sort, the serious errors have been errors of omission.

It might be possible to over-estimate, but in an estimate based upon profile quantities, as this is, the almost absolute certainty is that the error is of under-valuation, rather than an over-estimate. The profile fails to show swamp land, where settlement has taken place and additional earth has been hauled in, or earth for filling sink holes or swamps, or earth hauled in to widen embankments, or where cuts

have been taken out by steam shovel work and material used elsewhere. My contingency percentage is lower than in all Cooley appraisals, where 10% was applied to all items, in-

cluding the overhead charges.

In every appraisal of railroad properties, a percentage has been included for contingencies, the amount of which has not been uniform. I have had frequent opportunity to observe the propriety of the percentage by comparison with actual results of work for which I made estimates. It has been my practice to allow 10% for contin-

gencies in all estimates for new work. I have never been employed on work where the element of contingency in some form did not enter into and affect the cost to such an extent as to wholly or

largely justify the percentage used by me, of 10%.

In general, the problem of estimating reproduction cost is more difficult than estimating the cost of new construction of a standard property, as the estimate for the new property is based upon complete surveys and specifications, etc., and the contingencies should be limited to elements of unseen construction, such as clay soil, rock, hard pan, quick sand, swamps, sink holes and weather contingencies, and not upon the omission of things to be done, while in the case of an old property all these things enter in; the property has been built so many years that perfect history of construction cannot be secured, and many things are not found that were encountered in building the property.

In my opinion, a contingency allowance is proper and necessary; the amounts added are reasonable, and I believe that, if it were possible to determine the exact history of this property, it would be found that all, or substantially all, of the amounts named for reproduction

cost of contingencies have actually been incurred in the way of contingent expense. Without attempting to make a complete check of the property, I have noted the following items emitted from my appraisal:

(a) Riprapping along shore of Marquette harbor, which cost the

company thousands of dollars.

(b) Riprapping along shore of Lake Michigan. (Hansel made a careful survey of riprap, and found a total on the line of \$4,110.)

(c) Bridge crossing warnings or ticklers entirely overlooked,

which would run into several hundred dollars.

(d) In some bridge estimates, masonry was based on pedestals shown upon plans; by photographs of the bridge received since the computation was finished, it is shown that there are a couple of hundred feet of masonry retaining wall connecting these pedestals, built as shore protection, and in other instances items disclosed by the photographs have been overlooked.

I believe a careful checking of all these schedules would disclose hundreds of items that might, or should, have been included in in-

ventory.

Legal expenses during construction fixed at one-half of one per cent of items 1 to 37 inclusive; one-half of one per cent of items 1 to 37 equals \$85,122, for the fair present reproduction value and present physical value.

On construction work I have been connected with, the element of legal expenses incurred throughout. Services of an attorney are required pretty constantly during construction of roadbed

across lands acquired; controversies with contractors are frequent, as are claims for damages to property of adjacent owners, by setting back of water, building new embankments, and fire, and on account of injuries to persons during construction. I have never seen extensive operations carried on where services of an attorney

were not almost as constantly in demand as engineers, though not in

so large a force,

Engineers rarely include this item in detailed estimates, as it is an overhead charge, placed by general officers. It is a custom in valuation work. Legal expenses are rarely under direction of engineer. It has been customary, in all of the state appraisals and appraisals for railroad companies, to allow for legal services by a separate item, or to include a percentage for legal services with engineering. The item is usually expressed in a percentage of other items, as I have done, and a percentage of .5% has been most generally adopted in valuation work during the past 10 years; this was the percentage allowed by Michigan appraisal of 1900, applied, I think, though I am not certain, to substantially the same items—1 to 37 inclusive.

Organization, administration and general expenses during con-

struction fixed at 2% of items 1 to 37 inclusive, \$340,490.

This item is inserted to cover those expenses of construction which must necessarily be incurred in connection with the incorporation, organization, preliminary financing, and the administration of the

property during construction period, and the general expense 56 covering clerical help, accounting forces, and other official and clerical organization, office rental, supplies and expenses incurred during the construction period and not otherwise provided for.

Nothing is included for discount, bonus or commissions, etc., but I have included a figure which I believe to be reasonable, to cover expenses that would necessarily and properly be incurred in the construction of this railroad. I don't know of a single instance where items of legal expense and organization, administration and general expense have not been incurred in large amount, and I do not know of instances where these items exceed the percentages named by me, very materially.

In Cooley appraisal of 1900, 2% was allowed for organization, administration and general expenses. Percentage for this item is customary in appraisal of railroad properties, and every such appraisal made by state or railroad authorities has included this item, and used

from 1.5% to 3.5%, usually 2% or 2.5%.

Item 37 is a physical allowance. Items 38 to 40 are overhead charges, to which are sometimes added discount, commissions, general contractors' profit, etc., all of which I have excluded as not being proper in an appraisal of this kind.

Interest during construction fixed at 7.5% of items 1 to 39 inclusive, \$1,308,757 set down in both the reproduction column and the

present physical value column.

This is an allowance to cover needed expenditures for interest on capital invested in railroad during construction period and to the time operation of the property commences. To get at the amount, we must determine the time required to construct the property, and the rate of interest to be paid. I assume a rate of 5%, and that it would require not less than three years from commencement of operations to completion of the property, which would be 15%. I assumed interest on the whole amount for one-half the time, on the

idea that one-half of it would be idle for three years, the investment

being made through that period.

I do not believe that it would be possible to build any portion of this particular property and put it in operation in advance of the whole property, assuming the reproduction of the entire property new, or that it would be profitable, or that it would in any way materially reduce the interest item. The cost of operation before completion would not only consume the revenue, but would seriously interfere with the construction. The bulk of the equipment would come on to the property in the last few months, while the major part of permanent way would be built in early part of the period. It is fair to assume that, on the average, money would be in use 1.5 years before the road is in operation.

In order to build the line in three years, it would be necessary to start simultaneously at a number of points and carry on the grading and bridging on substantially the whole line. My three years' estimate applies to the Michigan property alone. The South Shore line from Nestoria to Iron River took two years and eleven months to complete, and it took a year to extend the line from there to the west

end. Three years is as short a time as possible in which to build South Shore in Michigan, with structures, ore docks and terminals; construction of ore docks would take a year, or

more.

In Cooley appraisal of 1900, 3% was allowed for interest during construction, with regard to mileage of road or character of construction; the same percentage was used in his subsequent appraisal, and in Wisconsin. The 3% was on the assumption that all the roads in Michigan would be built in short sections, requiring one year for con-

struction and completion, at a 6% rate.

I am familiar with conditions governing the financing of railroad properties. In my judgment, it would be practically impossible for a new company, or any company not thoroughly established, and with the highest credit, to secure money for new construction at 5%. I believe it would be impossible for South Shore to secure the money for less than 6%, and then only upon selling at 20% discount. In recent years, most railroad engineers have included a percentage for interest, though previous to last few years it was not considered within engineers' province. The general practice of taking the full interest rate for half the period is the general method as practiced by myself, and, so far as I have seen it, in estimates of other engineers.

Stores and supplies, \$277,904, to be apportioned, 82.5% to Michi-

gan and 17.5% to Wisconsin.

This is the total of inventory on Auditor's books, June 30, 1911.

The totals for this item, as appearing on June 30, for the years named, are: 1900, \$253,052.46, 1901, \$195,708.69, 1902, \$198,013.48, 1903, \$225,196.83, 1904, \$241,355.18, 1905, \$247,443.24, 1906, \$356,804.85, 1907, \$285,921.00, 1908, \$371,045.54, 1909, \$270,812.32, 1910 \$285,043.39, and 1911, \$277,904.01.

The apportionment between states is on a track mileage basis, being 82.5% Michigan and 17.5% Wisconsin.

Working capital:

This includes money and bills receivable. I accepted Mr. Delf's statement, that \$240,000 was a fair average, and less than the average for the year. In my opinion, the amount is reasonable, being a little below what I would expect to find and less than I have found in roads of similar mileage in other localities.

In my opinion, the fair present reproduction value of the property of the D. S. S. & A. in Michigan, including the car ferry, Chief Wawatam, and including stores and supplies and working capital, is not less than \$19,199,105, and the present physical value is \$16.

132,083.

In placing land values, I have assumed that the company would reproduce the title now owned by it; with but few exceptions, it owns the land in fee simple. I think I pointed out the cases, except in case of right of way, where there is considerable right of way occupied, fenced and cleared, to which I can find no title by deed; this is between 300 and 400 acres, out of a total of 6,000. I make no differ-

ence in estimating the value of these and other lands. My valuation rests almost entirely upon the idea that the estate of the company is in fee simple, or its equivalent, with the excep-

tion of the few cases noted, mainly in Marquette County.

In mineral districts, I attributed nothing as an element of value to the fact that mineral was in the land, except that the cost of securing lands in some parts of the territory would be made more difficult and expensive. I have not included any value under the land, or any possibility of value, by reason of use or sale of mineral rights. The fee simple title which I value is the perpetual right to maintain the track and right of way, and use the land for railroad purposes.

It was the perpetual right to use, with the reversionary clause in case of abandonment of use, that I valued. In mining districts, where right of company is less than perpetual, and terminable upon conditions, I think that, in all such cases where I have placed a value, I have taken those facts into consideration, and they are reflected in the value placed upon the land. In certain instances, in Marquette County, I valued simply the right to maintain a single track.

(Complt.'s Ex. 12, Riggs, a comparative summary, showing total, by schedules, of Michigan appraisals of 1900 and 1905 and Riggs' appraisal of 1911.) There is a slightly different definition of some of the items, especially the trackage intem, from which I separated 16, side tracks; the aggregates are the same. (Stipulation that figures of former appraisals may be used, subject to correction from original source.)

(Complt.'s Exhibits 1 to 13 inclusive offered in evidence, subject to objection detailed.)

61 (Complt.'s Ex. 14, Riggs, blue print pages, being index to rail and ballast record of tracks, and a sample page of rail and ballast record, Ex. 10, all introduced in evidence.)

(Complt.'s Ex. 15, Riggs, a blue print map of tracks and property of company from Negaunee east limits to Ishpeming west limits, scale 400 feet to inch.) This map heretofore referred to in my testimony.

My appraisal includes only physical properties with percentages added to cover overhead charges on elements of cost not capable of inventory, the expense of which is a part of creating the physical property. No allowance is made for good will or going concern value. No general contractor's profit, discount, cost financing, commissions beyond 2% for organization, administration and general

expense, are included.

I did not attempt, in fixing the depreciation, to express any relation by that depreciation figure between the operating efficiency of the property as it is now and the operating efficiency of a new property. The figure rather represents the physical depreciation or loss of life, which should be in every case represented by a reserve created to take care of the renewals of the property, or to replace various units of the property when they come to the end of their life and have to be replaced by new units. Much of the property that appears with heavy depreciation in these figures is as efficient and capable of doing the same service, and is doing the same service, that new property would do.

I considered the property, taking into account its character, the service which it renders, its construction, and the country operated through, as a highly efficient and well maintained property of its class. It is well suited to render the service demanded of a railroad

in its locality. While certain of the elements are depreciated, such as ties, at 60%, they are as valuable to the public as though in 100% condition. What was said as to ties applies

to other elements of the property which depreciate.

In my opinion, the property, as it exists today, as a unit, is more valuable as an operating tool than it would be if it were wholly new, by reason of the fact that on a new property the roadbed would be green, would settle, that the other elements of physical property all have to be tested out and large expenditures made upon them to remedy defects and bring them to a condition of operating perfection or safety, and all of the machinery and equipment would have to be broken in and would have to have considerable sums expended upon it before it would be in the condition of operating efficiency that the property is in today.

The operating expenses, exclusive of the elements of renewal, as they apply to the maintenance account, would be more in the case of a new property than in the case of this old one. This property is renewing the various elements that enter into it from year to year, and is expending new, each year, considerable sums of money in such renewals that would not take place in the case of a brand new property until after the end of the third or fourth or fifth year.

I would term a property as new during the first three or four years of its life, though the adjustment of buildings and breaking in of the equipment would probably come in less time, while solidification and settlement of embankments and fills, adjustments of drainage,

and proper size of waterway openings, would take a longer

63 time.

I have made no allowance for appreciation of roadbed, embankments, bridges or structures, and have not included any-

thing for solidification or adaptation. Except as appreciation is reflected in unit prices of today, applied to structures built when work cost less, there is no element of appreciation in the appraisal.

Q. That leads us to the question of just what conceptions were the basis of your estimate of the reproduction new cost of this property?

A. I have conceived the elimination of this property and its reproduction new as of the past year, when applied to prices, assuming all other lines of communication now existing and all surrounding conditions remaining as they are at the present time. In other words, I have not taken into account hauling of materials through the woods for a distance of many miles, nor have I taken into account the extra cost, for instance, of pile driving by reason of the use of team drivers, horse drivers, but I have conceived that all other means of rail transportation and existing means of water transportation remained.

I include in my right of way estimate 15% for attorneys' fees and incidentals. I have never been able to estimate right of way high enough, except once, when I made a straight estimate of \$5,000 an acre, at Negaunee; there, I was a little high. I have had some right of way work where I had no attorney's fees, and others where

they were 50%.

On August 20, 1912.

Riggs.

Direct examination resumed.

By Mr. Butler:

Since giving direct testimony, I have examined the transcript and been over the line of the road, accompanying engineers of the State on their inspection trip. I have made examinations of maps of one or two towns, and believe my testimony and exhibits should be corrected.

64 Complt.'s Ex. 1, Riggs, page 16, L'Anse, acreage previously stated, 45.2, at \$1,500 per acre, value \$67,800; this should

be reduced to 32.1 acres, with value of \$48,150.

Complt.'s Ex. 1, Riggs, page 17. Thomaston station grounds, previously included 60 acres, at \$200 per acre, being the acreage of Cooley appraisal; on further inspection, I find actual acreage 20.5 acres, which would reduce value from \$12,000 to \$4,100.

Complt.'s Ex. 1, Riggs, page 208, wooden turntable at Republic, 50 foot, built in 1900, cost of reproduction, \$2,750, and present value, \$2,062; due to fact that this is an obsolete and inexpensive type of turntable, reproduction cost now reduced to \$400, and present

value to \$200.

Complt.'s Ex. 1, Riggs, page 286, International Bridge, cost of reproduction, \$314,864, and present value, \$291,427; one-third interest was assigned to South Shore, when it should have been one-quarter interest, and South Shore proportion should be reduced: Cost of reproduction, from \$104,954 to \$97,142; present value, from

\$78,716 to \$72,857. Portage Ave. bridge, at Soo, I have assigned to Terminal Co., though bridge record of South Shore shows it as South Shore bridge. (Mr. Eldredge states this bridge to be South Shore ownership and covered by lease of one-half interest to Soo Line, stating one-half, instead of one-third, to go to South Shore.) In my appraisal, I attributed one-third of Portage Ave. bridge to South Shore; if owned by Terminal Company, one-fourth should be so distributed; if owned by South Shore, one-half should be attributed to it.

By going over the road, checking the valuation, item by item, it would be possible to find a considerable number of items that might be increased by placing a higher percentage of condition,

and perhaps an equal number decreased for the same reason; but, generally speaking, I have made no glaring errors, except those I have called attention to, and see no reason for making further corrections. I have recently made a trip over the entire mileage of the road.

At Sidnaw, it is possible my judgment has been somewhat affected by general character and upkeep of plaintiff's property and buildings, and that I have placed too high a value; I have no objection to cutting the value down to \$750 per acre, though I question whether

the property could be reproduced for that.

On real estate, I have based my valuation almost wholly on my personal judgment, based upon experience in purchases of railway lands, after having secured all available information and investigation of cost of other railway purchases in this and other states, in connection with valuation work. The information acquired consists, to small extent, of investigation of records and, to considerable extent, of sales for other purposes and the actual consideration paid by other railways for lands in the general vicinity, but the right of way values represent my opinion of probably cost of reproduction of these lands for railroad purposes, assuming South Shore did not exist.

The Master: In making up that judgment, you first determine what the land would be worth for other purposes, and then add what it would cost to acquire it for railroad purposes, is that correct?

A. Not altogether, for the reason that in many instances, particularly in the cities, the element of damages, the element of the cost of acquisition, I have aimed to include in this figure a figure 66 that would cover not only the increased value of the land over other land by reason of its railroad use, but to cover whatever there was in the way of severance damages, and of the cost of acquisition, which in ordinary country lands is a very considerable percentage of the total cost.

The Master: By cost of acquisition, you mean what is added to the

value of the land for other purposes?

A. No, by cost of acquisition, I mean the cost to the railway company of acquiring the land, including the making of the abstract (it is usual and customary for railroad companies to have an abstract of the properties made, for their own use, before starting negotiations) and, in addition, the amounts paid to right of way men,

real estate men, employees of the company, or others, who negotiate and actually purchase the land. There should be a separation into the consideration paid for the land and the second element cost of acquisition. In the first element, the consideration paid for the land will range from two and a half to three, or even as high as five or six times the value of the land for other purposes.

Riggs:

Cross-examination.

By Mr. Wykes:

In fixing land values, I have taken into account the fact that there is invariably an excess cost of lands purchased for railroad purposes over lands purchased in ordinary commercial tracts for farming or other general purposes.

Q. And that excess runs from two and a half to six; that was present in your mind when you fixed your land values, was it not?

A. Yes, sir, it was present in my mind, and I aimed to take account of it in fixing these prices to an extent that would be conservative and reasonable. I did not in any case use a factor of six; in fact, I did not use that general method.

Q. You did not use any factor to get right down and state a per-

centage, did you?

A. No, but I did use my own personal judgment, keeping in mind

the fact that there was such a factor.

Q. In other words, you consider there were three elements; there are more, but we will divide it into three classes, the cost of the land for ordinary purposes, then whatever would be included by way of severance damages, and then what should be added by way of cost for purchase?

A. Yes sir.

Q. Did you fix any definite relation between the cost for ordinary purposes and the cost which it would be for railroad purposes?

A. No, I did not. In the matter of country lands, I had generally in mind a factor of two and a half to three, and used figures throughout that are based generally upon three times the ordinary value of

country lands, plus cost of acquisition.

The cost of purchase of country land is always a considerable item. I have found no railroad purchases in Michigan where the consideration paid the owner was less than \$20 an acre, and \$25 an acre is a minimum average paid owner, where purchased by agreement for railroad purposes; where purchased by condemnation, it is considerably in excess. The difficulty in arriving at a figure representing fair cost to acquire land is due to the fact that very few railroads have separated the consideration paid from the cost of abstracts, salaries and expenses of right of way men, cost of

68 condemnation, etc. In one case, where separation was kept for a five-year period, the cost of purchase per acre ranged from 75¢ to \$25, while the cost per owner dealt with, or per transfer, ranged from \$98 to 140 plus.

The cost of acquiring a long strip of right of way from a single individual might probably be less than the expense of acquiring a small description from another person. Ordinarily, in dealing with a farmer or small individual land owner, it is necessary to make three to ten trips to see him, before a price can be agreed upon and deal consum-ated. I know instances where cost of acquiring was in excess of total amount paid for land. The available information as to actual cost of purchase is not such as to enable one to definitely fix an average price per acre.

I did not fix an average price. In country lands, I have used a minimum of \$25 an acre, in which I have included cost of acquisition. I should say that would range from \$5 to \$15 an acre, through territory such as this, assuming separate ownership. I have not added any specific amount, but have fixed what I believe fair figures, including the cost of acquiring. In South Shore terri-

tory, that cost would range from \$5 to \$15 per acre.

I fixed figures that in my judgment would fairly represent the money a man would have to have if he went out to acquire that property for railroad purposes. I am not able to divide the cost of land so as to give the figure added for cost of purchase. I did not analyze my land values so as to show market values, added increment by reason of railroad purpose, and added cost of acquisition. I am fully convinced that the figures I have named for country lands are so conservative that my total amount would be exceeded, if we were going to have the land now, in the element of considers.

were going to buy the land now, in the element of consideration paid to owners, only. I do not believe my figures are high enough to cover any considerable cost of acquisition.

I am not able to point out the different elements that go to make up my prices. The results are a matter of my best judgment, and that might vary from that of some other man, up or down. My judgment was made up, based on inquiry, first, as to cost to railroads-the consideration paid to owners; second, upon inquiry and finding out that lands were valued in certain districts at so much per acre for the land, plus an estimate of the value of the timber standing on the lands, in the case of timber lands; and third, that cleared, improved lands in certain territories were selling at prices ranging from \$40 to \$75 per acre, and taking into account all the elements, I have used figures that I believe represent a fair average figure, although I think that in counties such as Ontonagon and Gogebic, for instance, lands that I have averaged at \$60 an acre. actual purchases, actual considerations to the owner might range from \$25 or \$30 up to as high as \$150 or \$175, depending on whether it was cultivated farm land or whether it was covered with good timber.

I have since been over the line twice, on special trains, and from Marquette to St. Ignace four or five times, by daylight. I have been around Marquette yard and property more than any other part of the system. While I have made no attempt to make a complete list of items not included in my appraisal, I have noted a couple of classes of items: (a) riprapping in Marquette yard, and along Lakes Michigamme and Gogebic, (b) ticklers at overhead bridges and

numerous minor structures, and (c) the photographs disclose, and I have noted by various inspections, more masonry in the way of retaining and parapet walls built between piers and bridges, and at the end of culverts.

I think all of the points I have noted are of those general classes; e. g., either more masonry than we have estimated upon, or minor structures of which there is no record in the engineer's office. All were visible items of work, like riprap, which would be put in by the roadmaster, probably in no case part of original construction, but built subsequent to the building of the road, and a class of work of which no record would be kept in the chief engineer's office. The riprap omitted here in Marquette is 700 or 800 feet of bank that has been protected by the unloading of large stone.

I made no estimates of this at Lakes Michigamme and Gogebic; there is riprap at three or four places at each lake, in lineal feet more than at Marquette, but the embankment is not as high and does not call for so much stone, and the location would not call for as heavy protection as on south shore of Lake Superior. The additional wall I have noticed was at one point, in one of the steel bridges; I am not sure whether it is an iron bridge, or the other steel bridge west of Nestoria, but it is one of the two. Also one of the arched culverts between here and the Soo. It has 75 or 80 feet of protection wall, an extension of one of the wing walls.

The total amount of masonry on the road in connection with bridges is a very small item; only a few bridges have masonry in connection with them. The witness made notes of the omitted

things.

In my opinion, reproduction new value may represent value for railroad purposes more accurately than the lower figures; while it is not true in every case, I believe that, where conditions are such that if the property were eliminated it would be reconstructed, the

property is worth what it would cost.

In my judgment, if South Shore were obliterated, it would be reconstructed, as it is the only link of direct connection between Upper and Lower Peninsulas, and the only direct connection from Copper and Iron Country of Upper Peninsula with Duluth and the northwest. I don't believe it would be possible to reproduce the property as it stands today under \$19,199,105. It might be possible to go 10 to 20 miles from Marquette and establish a new terminal. I mean it might be possible to get away from some of the more expensive terminals and build facilities for handling certain classes of business at a less cost, but it would be impossible to serve the same location on any other route. In many cases, it would be impossible to materially change the route; e. g., any line serving Marquette, Ishpeming and Negaunce extending east of Marquette would have to occupy about the same location as this road from Negaunce to a point six miles east of Marquette.

I think the road would be put back at a greater cost than its commercial value. If the road were out of here today, other men would be found who would come in and speculate on the proposition of a road connecting the copper and iron country with the Lower Peninsula, and I think that the same considerations that caused investment originally would cause the reinvestment of enough money to produce the property. The belief that it was a good thing caused the original investment. I don't know what the original investment was, and made no endeavor to ascertain that, as many of the old records of the company were destroyed by fire, and so far as I know there is nothing in existence relating to original cost of M. H. & O., M. & W. or other extensions prior to the eighties.

Undoubtedly, many items of original cost of a property built many years ago would be less than reproducing the same items today; that would be true of timber construction and hauls, and also items affected by labor, so far as original

work was done at a period of low labor prices.

On other items, where the existing property is a replacement of the original structures, that would have cost more on first construction that it would cost to reproduce the property at the present time; that applies to all forms of steel construction, cast iron pipe, masonry and other construction work. I think it is true that, on the whole, a road built in the period of 1858 to 1888 probably did not cost as much as to produce the property today, new, on items of timber construction, such as bridges, buildings, etc. On real estate, the cost would be materially less.

To some extent, the road was built over land grant areas, and to a large extent through timbered areas, where it was to the interest of the owner of the land to have the road, to bring his timber to market; that would affect the price. I know nothing about the local conditions at that time, but that was the fact on a considerable mileage of similar territory in Lower Peninsula. I think an analysis of most of the gift right of way would show that conditions were attached to it that would really make a material consideration in

many cases.

In stating, in my article before the American Society of Civil Engineers, that there should be but one value, whether for reorganization, sale, taxation or rate making, I endeavored to make clear that the engineer should report facts as he finds them, and give his best judgment of cost and depreciation, and that it is no part of his duty to decide what should be included or excluded for any specific purpose. The physical reproduction value should be the rame, whether used for taxes or rate making purposes. My value of \$16,132,083 for Michigan is my judgment of reproduction

value affected by depreciation. It may be too high or too low for any other specific purpose. I have not included or deducted anything on account of earning ability, going concern value or intangible value. In real estate, I have included a value due to the value of land used for railroad purposes, the severance damages, the continuity and all other elements that go to make a value for railroad, different from a value for other general, purposes.

Q. Is not the excess value that this continuous right of way has for railroad purposes due to the ability to make earnings from that

continuous right of way?

A. The higher value given to railroad lands is in large measure due to the higher use to which the land is put, and to the greater earning power of the land under that new use, and that higher use and higher value is clearly a part of the reproduction cost, although not necessarily to as large a degree a part of the original cost, but it is clearly a proper element for reproduction.

Q. The only thing that justified it is the fact that increased earnings over the ordinary use of this property may be produced upon it;

isn't that true?

A. That is one element. The fact that the land is available for railway use and desirable for railway use, and the fact that when put to railway use it is capable of earning more than other land not put to such use, go to give the land a higher value.

Q. Then there is a value in that sense due to earning ability,

increased earning ability?

A. To an extent, yes sir, as far as that increased earning ability may be said to be part of the higher use, if I may use that term, of the land, than if it was devoted to raising corn or celery, or

alfalfa. The reproduction cost would be the same, whether the investment be profitable or not, and whether the rate for passengers be two cents or five cents a mile. I have not undertaken to carry out my analysis of land values to such an extent. It is practically impossible to go through a county and say that the average is so many dollars per acre for the severance damages to continuity, and so many dollars per acre for the cost of acquisition, because one piece may be acquired at one figure and another, nearby or immediately adjacent, at a considerably higher or considerably lower figure, and practically no purchase of land has ever been made where the owner of the court has fixed all of these elements; courts have undertaken to say that the land is worth so much and that the damages are worth so much.

Q. In other words, we cannot give that?

A. You cannot; I have never seen it separated or never known

of anyone attempting to separate it.

I have not added anything to the value for strategic position. The location from here east, where I have used a higher figure, the figure was made wholly on account of the nearness to the city of Marquette, and the fact that it was desirable, especially desirable land for other than railroad purposes, and that the price of the land would be materially higher than the price of a similar number of acres located over near Sand River or near the west county line, but there are a few locations on the line of the road where the road occupies a narrow bench, or a narrow valley, that has a distinct strategic value, and if it were necessary to locate the railroad elsewhere it would be impossible to build the physical property of the road anything like as cheap as the present property has been built for.

Thave not taken into account any assumed saving by reason of such location. Take, for instance, this line going east; if it were not possible to locate on that bench between the foot of the bluff and the lake shore, it would be necessary to go back into

the hills, introduce very heavy grades, and introduce many thousands of yards per mile of earth excavation and embankment in excess of the present excavation and embankment, and there are a number of locations where a similar condition prevails, and the fact that the road is located in that immediate locality is worth a great deal of money to the road, and if the road were being reproduced they could afford to pay a good many hundred dollars an acre for that right of way, rather than to accept a free right of way elsewhere.

My value included any increase in increment along South Shore, in the belief that the railroad is entitled to include in its value whatever may come from the increase in land values, just as the owner of a farm is entitled to include the increase of his land, as property. There has unquestionably been a large increment of land value along the South Shore. In particular instances, the figures I have named as fair cost of reproduction is less than actual cost to the company of acquiring the land. There has been a decided increase in country land values in several sections of the state and along the line of the railroad, and in some of the terminals, in the last few years.

The purpose of the 1900 appraisal was to furnish information to the state authorities on which to enable them to base legislation for equitable taxation of railway and other public service property.

Q. It has been thought, previous to that time, that the railroads

were not paying taxes enough.

Mr. Butler: By whom?

76 Mr. Wykes: By the public and the Governor and the people who promoted this valuation. That seemed to be the sentiment in Michigan that led to this valuation, was it not?

A. Yes sir, I think so.

Q. And the purpose was to increase railroad taxation, was it not?

A. Well, the purpose that Mr. Cooley had in mind and expressed throughout was that the purpose of the engineering work was to furnish information as to the true physical value of the property of the company, to enable the Governor and the Legislature to prepare proper legislation.

Q. And to increase railroad taxes?

A. I won't say anything as to the motives of the Governor, but the effort througout the valuation was to eliminate from the minds of the men on the work the purpose of the valuation, and that for the reason that every man engaged in a prominent capacity on that work was a railway official, not at the moment in railway service.

The purpose of the 1900 appraisal, followed throughout, was to make a fair value of the property of the railroads, and the work was done by competent men, the force being as thoroughly experienced a lot of engineers as has ever been gathered on any public work. Considering the shortness of the time, the fact that the work was done in winter, and that railroad records were not kept or were inadequate, it is one of the most wonderful pieces of valuation work done in the country, and, as a whole, it stands up as a fine piece of work.

The Cooley valuation of railroads, including the South Shore, is the nearest approach that has ever been made to a correct valuation of any of the railroads of the state, and, while not at the time claimed to be absolutely correct, it was claimed by Mr. Cooley to be, in his judgment, the best that could have been done, considering the lack of hearty co-operation of the railroads and the limited time for the work.

While I give both cost of reproduction and present physical value, it appears to me that a company of individuals is entitled to a return upon the entire investment in a property, provided it is maintained at substantially 100% efficiency. That is my judgment and opinion of what is right and wrong. I do not assume to state, as my opinion, any conclusions I may have drawn from reading the differ-

ent cases.

The depreciation of a property of this sort begins as soon as the structure is built, and, to a greater or less extent, goes on increasing from year to year. The depreciation from year to year is partially offset by maintenance, renewal and running repairs, but, in addition, a depreciation takes place that must be represented by the difference between cost of reproduction and present value, in that every unit of the property will, sooner or later, come to the end of its life. If the company does not lay aside from earnings a fund during the lifetime of a unit, to replace it when the end of the life comes, the company must stand the loss. This difference between cost of reproduction and present value represents the accumulated wear, tear and loss of life of the various elements of the property.

I think that whether one or the other figure is to be taken as the beasis of rates depends upon whether the owners of the property received the benefit of that difference in dividends, or whether it has been used up in service and they have received no benefit. A prop-

erty where excessive returns are taken out in dividends should be differently treated from one which barely exists without caring for depreciation. If, as the property wears out, a sinking fund were created to represent depreciation each year, the investment would be intact, and on that theory there would be no question that there would be the investment there that should receive a return. If no sinking fund is created, the life of the prop-

crty that is there to serve the public is being exhausted.

The I. C. C. rules require setting up a sinking fund, to take care of buildings, tracks, bridges and other structures. Prior to July, 1907, it was almost the universal practice of railroads to disregard depreciation. In my judgment, a fund should be created covering, not only equipment, but all forms of perishable property, and each year enough should be put into that fund to replace the wear of that year; each year should take care of its own depreciation.

Theorectically, every year should bear its own depreciation, but, practically, you cannot apply that rule, on account of widely varying accounting practice of the different roads in the past and the varying practice now regarding the setting up of depreciation reserves in the case of tracks, buildings, bridges and other structures, other than equipment. It is not obligatory upon the roads to set up

depreciation reserves for other parts of the property than equipment,

though some roads have done so.

In determining a value upon which to base a fair return, there are many things which must be taken into account other than the mere cost of reproduction or depreciated value. In choosing between the two, you must consider all elements of the past history of the investment, its returns and depreciation. There are roads in Michigan clearly not worth, for any purpose, what they cost, or what

they would cost to reproduce, being examples of ill-advised expenditure of money, and the roads, if eliminated, would not be reproduced today, there being no necessity for their existence. This road, in my opinion, is not in that class, and, if wiped out today, it would be necessary for the state to have it reproduced. I think that if it were not here today, all other conditions existing as they are, it would appeal to investors as a good proposition and would be

reproduced; that is, that money would be found for it.

Any appraisal is a reflection of the judgment of the man or men who make it. The Cooley appraisal was the first of its kind, and was made by men without previous experience in appraisal work. The opinions held by these men 12 years ago are not necessarily held by them today; many of them have materially changed their views on account of their subsequent work and investigation and more full knowledge. Since Cooley appraisal, the accounting system of the railroads has changed, and information not then accessible is now, and has been for many years accessible, and, instead of expressing opinions based on recollection, as was then the case, opinions can now frequently be based on facts capable of being drawn from actual accounts. I believe I now know more about valuation work than ten years ago, and I have changed some of my views radically.

Cooley appraisal of 1900 was regarded as sufficiently accurate to make it the basis of the 1902-1905 valuation, which was, in effect, the bringing of the Cooley appraisal of 1900 down to date, by part of the same men as were employed in the 1900 appraisal. They were among the best men. The time for the 1902 valuation was limited; there was no field work for Upper Peninsula. The purpose of the

1902 valuation was to prove that railroad assessments were not excessive. The effect was to show that the complainant railroads, of which D., S. S. & A. was one, were under-assessed to the same extent as the general property. The purpose was to sustain the 1900 valuation, which was in excess of the assessments.

In 1902, Cooley's instructions were the same as in 1900; it was his desire, and that of his men, to get a correct figure, as nearly as possible, irrespective of results. In 1900, the men were instructed to disregard the purpose of the valuation; in 1902, the men all knew the purpose of the valuation, but I do not believe that caused any

improper additions to the valuation.

I think it is unquestionably true that an engineer engaged upon appraisal work is influenced; he is surrounded by men who are seeking to establish certain things, and his work is essentially affected to some extent by the object of the appraisal, and that is the reason why all of the Cooley appraisals have been done by the organization of a staff of experienced men, and not be depending upon one or two men with a lot of subordinate clerks.

Q. That was what led you to devote two or three pages, in your article that you read before the American Society of Civil Engineers, tending to the placing of safeguards against this bias that was sure

to come in any work of appraisal?

A. Yes, I believe thoroughly that where one man goes in to make an appraisal, and surrounds himself by a lot of young, inexperienced subordinates, who carry out his will absolutely, or who carry out the will of the men who are having the appraisal made, that appraisal is bound to be affected, more or less, by the purpose for which it was made, and that it is far better to have such an organization as we had in 1900, consisting of 25 or 30 men with years of experience, and

men of standing, to offset that tendency.

81 Q. But even after that experience that you had in 1900, with that select type of men, and your experience of 1905 and 1903, when you wrote your article, you said in it that it was im-

possible to get this bias out of your results, did you not?

A. Yes, absolutely, for the reason that we had railroad men; we had to have an organization made up of railroad men, and every one of those men had inbred in him the old railroad employee's idea of the tax gatherer, and, if we had permitted the idea of taxation to prevail, the tendency on the part of every one of those men would have been to under-value for purposes of taxation.

Q. And so from that we draw the conclusion that it is impossible in an appraisal to be without some unconscious bias by the purpose

of the appraisal?

A. I think it is safe to say that practically all of the large appraisals, the state appraisals, have been as free as possible from that. I believe that it is impossible to make an appraisal that is not somewhat, in some of the items, affected by that prejudice.

Q. And that might account, to a great extent, for the difference between a witness on one side of a case and a witness on the other

side, might it not?

A. That might account for the differences in some instances.

The 1902-1903 appraisal brought that of 1900 down to date, and made material corrections in real estate values. On roads in lower part of Lower Peninsula, corrections were made in unit prices of labor and material and new property added since 1900. Prices of labor and material were increased; there was a general stepping up of prices between 1900 and 1902, each year. In 1905 or 1906 ap-

praisal, the Cooley 1900 appraisal was the basis.

Professor Cooley was later employed to report to the At-

torney General the then value of the railroads, in connection with the 1905 assessment; the time was limited to five or six weeks, and no attempt was made to go further than to bring unit prices to date, and use additions and betterments as reported by the railroads. The Cooley 1900 appraisal was used as the basis, with my approval; the unit prices were adjusted, and I think there was quite an appreciable increase in valuation. On South Shore, there was increase

in physical valuation of about \$1,400,000, cost of reproduction, and

\$1,100,000, present value, between 1900 and 1905.

A non-physical value was added by Professor Adams in both the 1900 and 1903 appraisals; the increase in physical value was due primarily to additions and betterments; increased prices between 1903 and 1905 did not affect the value to a very large extent, though there was some increase; some small items were decceased.

My 1911 appraisal was hurried, on account of necessity of reaching a tentative figure for the purpose of the first affidavit. inspection was made before the making of the affidavit, and the determination of right of way figures was in substantially its final

form at that time—about September 1, 1911.

I regarded Cooley appraisal of 1900 as the most complete information available on such items as grading, clearing and grubbing; it formed practically the only basis for a quick determination. only correct way of arriving at schedule items would be to make a complete re-survey of the property, which would take several months and cost considerable. I believe a complete re-survey of

the road would show an increase of 10% to 20% over the earth yardage I have given. I applied new unit prices 83 throughout, basing them upon recent prices of South Shore.

or other roads in the locality.

In some items, they are materially higher and in some lower; on the whole, there is an increase over Cooley 1900 figures, but I think in matters of unit prices they are not greatly in excess of Cooley The tendency of prices of labor, lumber, and such 1905 appraisal. material, has been upward from year to year; prices on certain classes of construction, I think, lumber, ties, and materials of that sort, will continue to rise. The tendency of prices has been to steadily increase, except in the matter of rail; steel prices have remained absolutely stationary from 1900, and iron prices are more nearly stationary than other prices.

The cost to purchase runs through all my real estate values. This is made up of services, abstracting, recording deeds, and like features. I have considered the land price named sufficient to cover all those items prescribed by I. C. C. classification of construction accounts as assignable to the item of right of way. I included in my acreage, in every instance, lands acquired by adverse possession, but have made no deduction in those values for the absence of

services in acquiring, for abstracts, or for recording deeds.

All of the mine branches have very heavy movement of freight over them, heavy cars and heavy locomotives, and the same is true of these main stems, and the ties are in decidedly better condition on these main stems than they are on some of the sidetracks, especially in such places as yards, some of the yard tracks, where an examination, track by track, of ties would show a very poor condition on some of the tracks w-ere, apparently, no renewal has been made for

vears. Q. I think you made the remark that these branch lines were maintained in just a sufficient ratio of condition to be safe to operate?

A. Well, that is true, but they are lines that must be maintained in such condition that locomotives can pass over the entire length of them, and that heavy freight cars on the mine branches, the heaviest equipment the company has, can be taken over them safely, and their position and location is such that a derailment on any of them is a serious matter.

Q. But the logging and other branches, and industrial tracks, wouldn't be maintained to the same point that these mining spurs

are?

A. They have to be maintained in a safe condition. They are not as high grade tracks as the mining tracks, but they are tracks that locomotives are going in and out of, and they must be maintained in a safe condition to operate without accident or derailment.

The percentage of 60% for ties is the ratio applied to express the condition of entire line, and inspection would not necessarily show that to be the exact condition on a specific branch. I think that, in general, the ties on the branches are not maintained in quite as good condition as on the main line, but annual renewals are made on these branches, and the ties on some of them, like some of the lumber tracks, are in considerable better than 60% condition, by reason of the fact that the tracks are comparatively new. There has been, within the last four or five years, quite an increase, a large increase, in this class of mileage. There is 39 and a fraction miles of net increase in track mileage, by far the major portion of which is sidetrack and branch. The acreage of right of way has increased comparatively little in the ten years since the Cooley appraisal.

In fixing prices for 36 acres at Humboldt and 18 at Champion, I had no sales for railroad or other purposes. At those places, I took into account the ways lands were cut, vicinity of buildings, mining properties, etc., with considerable land at Humboldt included between the two lines, and that the severance damages in the vicinity of Humboldt would be very serious in case of reproduction. At Champion, the old line to Champion mine runs right through the village, and the new line runs adjacent to and north of the village.

Land values in the vicinity of Champion and Humboldt are affected by known or prospective mineral values, but I have not placed any value that reflects mineral rights. If it is taken into consideration, the prices would be very much in excess of those I placed, of \$350 to \$500 per acre. If reproducing South Shore, it would be essential to have 18 acres, for the use of this company, at Humboldt, though, by changing the connection between the two lines, and shortening up the wye, the amount of land could be materially reduced—say one-half.

My property values are:

Service.	C. O. R.	P. P. V.
Exclusive Passenger Exclusive Freight Common Passenger and Freight	\$507,665 5,557,099 13,134,341	\$377,133 4,184,647 11,570,303

Apportioning the common property between passenger and freight services on the revenue train mile basis for 1911, of 48.28% passenger and 51.72% freight, assigns:

Adding the passenger and freight proportions of the common to the exclusive passenger and freight gives:

Service.	C. O. R.	P. P. V.
Total Passenger Total Freight	\$6,848,925 12,350,180	\$5,963,275 10,168,808

I have worked out no other basis for the division of the common property; on some bases, it would possibly be widely divergent from the apportionment I made, and on others it would closely approximade it. These figures are the allocation of my values for the property between passenger and freight. It is impossible to separate the common property, except through some outside basis of apportionment. I believe the revenue train mileage basis for division to be fair.

At the Soo, plaintiff acquired 84 acres for right of way, yards and terminals. In my opinion, this is all absolutely proper, and is no more than such a railroad as this should have in such a city. So far as actual present use of 84 acres of Soo property is concerned, only a very small portion is presently used for railroad purposes. Plaintiff has parted with a half interest in its own land through lease for joint use, acquiring a half interest in the 84 acres of Soo Line, not presently used.

The original 84 acres of plaintiff at Soo is no more than a prudent railroad manager would require for railroad purposes, building into that city. The probability is that all that acreage not built upon will in course of time be used; the same thing is true of the Soo Line property. But at present they are using, under joint lease, the terminals of the other road. If they were two hostile roads, there would probably be a duplication of yards, round-houses and other property on these two parallel strips, and I hardly know what is a proper disposition of the unused lands in that instance.

All plaintiff's land at the Soo, except 7 or 8 acres of made land, which at one time had a sidetrack extending entire length, is in pres-

ent use; the 7 acres is included in my valuation as water front riparian ownership, which, to me, seems reasonable for future development. I think there is no present railroad use of the water front through this made land and extending west; there is no development in the way of mercantile wharves, etc., but it is land suitable for development for general merchandise docks of the company, for transfer to and from boats and cars. So far as I know, there are no plans for developing this water front, or for the use of the Soo Line property.

In my opinion, the land acquired by plaintiff originally is an absolutely reasonable amount to acquire and hold for railroad use; the same is true of the Soo Line. The element of uncertainty is intro-

duced by the arrangement between them.

I think the lands held by plaintiff will all, in comparatively near future, be used for railroad purposes, and that, ultimately, all the lands owned by both companies will strictly — used for yard and terminal purposes. The growth of the community would cut a great

deal of figure in whether those would be necessary. I don't think the fact that the Soo has increased but 2,000 (or 10%) in population since the development of its great water power would have any bearing in the matter at all, as the failure to grow

was due to the collapse of the boom due to the Clergue industries. I should think the trans-continental business through the Soo calls for terminals there. The importance of the Soo as a terminal and manufacturing point makes it almost certain to have a future. The Soo is a sort of a semi-terminal for international freight passing through it, east and west, it being the terminals of South Shore, Soo Line and Canadian Pacific, trains being made up there for moving eastward on Canadian Pacific. They combine the trains of the two roads (Soo Line and South Shore) that move eastward, at the Soo, and Canadian Pacific business is broken up and divided at Michigan Soo.

At St. Ignace, the following property should be excluded as not being used in railroad business: Humphrey lot, \$1,030, right of way to Martel furnace, \$3,423, 1,206 lineal feet of track of same in place,

and hotel lot.

In my affidavit, I excluded about one-half the acreage of the 70-acre tract (made up of 36 and 34 acres); I think entire 70 acres is properly railroad lands, and see nothing about it that would cause me to say any of it is not proper for plaintiff to own for yard extensions and shop facilities. Main line runs through the land east and west, one-third the way from north line. I think whole of right of way on one side is fenced, and portions of the property are used for manufacturing, and must be leased.

As to the water front property excluded in my affidavit, there are a couple of pieces that, so far as use for water front is concerned, cannot be said to be in present use; one is described as water front outside harbor, and is in at \$35 a front foot. The land extends from highway to water's edge. It is an open question whether any part of the hard land can be excluded. The riparian rights are not used; the land is used as a right of way, and the shore is riprapped along that frontage. From the main line track

to the water, it is not to exceed fifty feet; in places, it is 25 to 30. It would be possible to develop that by starting at either end, to get on to it. Use of riparian frontage there would involve considerable harbor improvement, making it expensive; there is nothing which would prevent its use, or that would make the cost prohibitive.

The hard land there is all used as main line right of way, and the center of main track is all within 60 or 70 feet from water's edge; my \$35 a foot includes the right of way and riparian frontage, and I took the value of riparian rights into consideration in fixing my

value.

A small acreage of land on south line, where plaintiff, in acquiring right of way, acquired the entire pieces, and where the building of the railroad has destroyed any value that this property had for other purposes than right of way, I have not excluded; such land should not be excluded. The 3 to 5 acres of this character is not actually used, the value, in my judgment, being entirely destroyed by the construction of the railroad. The value through here was \$200 per acre, including the piece spoken of.

This is one of those things incident to purchase of railroad right of way, where right of way costs less if entire piece is taken than where right of way only is bought and damages paid for the remainder. It might have a value for pasture, if joined to the adjacent

land.

In the neighborhood of the 70-acre tract, there are unused lands belonging to private owners; there are vacant and unused lots all through the city and in there. The property immediately south, joining this 70 acres, is not platted. In placing a value on the railroad property, the proper basis would be to ascertain what that property would be worth if platted. On all of these properties, the question was, what would the property be worth for other purposes. I platted no sales to determine the base value used for the 70 acres, but made inquiry as to lot sales in the vicinity, and used a figure not in excess of sales prices there. I was given sale prices and prices upon lands held for sale on the street that the Federal building is on, which is one of the principal thoroughfares of Marquette.

So far as I know, there is no present railroad use of Spring St. extended, Front to Lake Sts., 40 feet wide. There is a piece on the corner of the same block north, on Lake St., which is vacant; there

may be some storage on it.

There are two pieces of land, one on each side of overhead approach, that were, unquestionably I should think, acquired when right of way for approach was acquired. That property would come in the class of lands that plaintiff would be compelled to purchase to maintain the high trestle across the street, and, having put up the trestle, it would be unsalable for any other purpose. I do not think it would be possible to buy two 50-foot lots to maintain a trestle 60 feet in height, and then hold that portion of the lots, 30 or 40 feet, not used for railroad purposes; I question whether it would have any sale value almost immediately under that trestle. I place on all the property in that block \$50 a foot. If that were a fill, you would need it for the slopes.

91 Plaintiff's property at Marquette was acquired by at least three or four different corporations, at different times, namely, M. H. & O., M. & W., D. M. & M. and the Dead River. There were

three railroad lines converging in Marquette about 1888:

The Marquette & Western had complete terminal facilities at Marquette, with shops and roundhouses. The south yard, and the main line from a point near the present station, along the water front, to the old roundhouse, and then out over what is known as the south line, belonged to this company.

The Marquette, Houghton & Ontonagon owned the north line entrance into Marquette, from the depot west, including the present

roundhouse, shops and west yards.

The Detroit, Mackinaw & Marquette owned from the old round-house, near Jackson St., out along the water front, to the south and east.

These facilities were consolidated in the plaintiff, and, to a certain

extent, there was a duplication of facilities.

I suppose that what is the present water front inside the harbor was originally divided between the M. H. & O. and the M. & W., and there is a riparian ownership on land that was clearly the right of way of

the D. M. & M.

The 1,100 feet outside harbor is not used as riparian property, but as right of way, and every foot is in use to the extent that it is covered with railroad embankment and embankment protection, and railroad tracks. Whatever value the property has in the way of riparian rights is not now used by plaintiff. The 50 feet is actually

occupied by the track, and along almost the entire front plain-92 tiff has been compelled to haul and unload stone, to protect the railroad embankment from being washed by the waves. The whole strip of property is no more than enough to maintain a

single track between the road and the lake.

I placed a higher value per front foot on it than on adjoining lands, as its ownership carries with in the riparian rights, which are not used. Outside the right of way, there is no land; it is a narrow strip of land between the highway and the lake. It carries with it the riparian rights out to the harbor line, and no use is made of the lands under water.

The L. S. & I. in Marquette didn't go through Lake St. on a free grant; if all the items of general expense connected with the acquisition of that right of way were segregated, it would be an expensive piece of right of way. I am basing this on the knowledge that the amount of money paid engineers, to try and work out that line

through the streets, ran into several thousand dollars.

If right of way of South Shore opposite the 1,100 feet were in the street, I don't think it would make any difference in my estimate, though I have included 4%, aggregating something like \$600,000, for engineering, etc. Even granting that there was no consideration in money paid for the land actually occupied, there is the question of abutting damages to be settled; that makes that class of right of way the most expensive kind to acquire.

In Main St., Front to Third, plaintiff was granted the right to

place its track to the old ore dock, occupying perhaps 30 feet and leaving a driveway on north side used for a street and on south by plaintiff as entrance to its depot. For that 30 feet, I included \$75 a foot front, \$50 on west side of Lake St. and \$450 on each side of Front

St., on the theory that the property is in the possession of plaintiff, in actual railroad use, and that to acquire it today 93 would cost not less than those sums. I would consider that property on the principal streets of the city located as this is would have a per foot value substantially equivalent to the value of adjacent near-by and similar property, without respect to whether acquired by

near-by and similar property, without representation. deed, grant from the city, or in the course of litigation. Where I have The \$450 per foot includes all the elements of cost. allowed per foot prices, I think they are not in excess of reasonable and usual values for similar property, but that includes whatever there is allowed for acquisition. I endeavored to place prices, where I take it by the front foot, on the same basis as the value of adjacent near-by and similar lands, as I have been able to ascertain them, without regard to how acquired.

In my inspection for grading, I made no measurements, and took no cross-sections, but I had with me and examined, in going over the road, plaintiff's profiles, and at a number of points I checked, for several miles, the cuts and fills, to satisfy myself that the profiles were the correct profiles of the line, and that the work shown thereby had been completed. They were the original construction profiles, or copies; Ex. 2 is a condensed copy. We had the regular profiles with

us, but did not use them to any great extent.

After determining the quantities of grading, based on the profiles, I made certain additions which were not made in any of the Cooley This was discussed in Cooley appraisal, appraisals; e. g., shrinkage. it being the intention of the Cooley appraisal to include sufficient vardage of earth to allow for shrinkage. My recollection is that no specific allowance was made for overhaul, it being the intention to use a price per yard sufficiently high to cover that. It is customary among engineers to add a percentage to profile quantities for shrink-

age. I satisfied myself that whoever had made the computation 94 from South Shore profile had not allowed sufficient to cover shrinkage or waste, and that no allowance had been made for raising embankment, which has been done to some extent on South Shore, nor for filling certain bridges, filled prior to 1900 appraisal. reason, I added 10%, to cover shrinkage, and 7.5% to cover the other From subsequent examinations, I am convinced that my percentage additions are not high enough, and believe re-measurement and re-cross-sectioning of entire line would disclose at least 1,000,000 vards total more than I have estimated as having actually been moved in construction.

Cooley appraisal price for earth grading was 25 cents per yard. My recollection is it was discussed and decided that that price would be

sufficient to cover overhaul.

In Minnesota and other state appraisals referred to on direct examination I do not know whether they added a percentage for shrink-

age, or how they arrived at their quantities. It must have been added in additional quantities, because their quantities are higher; I draw that inference from the knowledge of the quantites they get and my knowledge of what would result from the profile. The inference is that it must have been added somewhere; but I don't know how they arrived at the figures showing the yards.

In other state appraisals for which I gave costs for grading, I do not know whether those took into account the items of overhaul and shrinkage in fixing the price, or whether a percentage was added: I assume those elements were taken into account, but do not know in what form. The general instruction in Cooley appraisal was to add

to figures computed from the profiles for shrinkage, but my ex-95 amination of the profiles indicates that the Cooley yardage was made by taking the embankment yardage as disclosed by the I figured it for portions of the line, and reached the conclusion that whoever figured it for the Cooley appraisal did not make

these allowances.

I satisfied myself, by examination of the profiles, that Cooley appraisal used embankment figures only. I tried to ascertain how the Cooley figures were made up. I did not go to the original records to find out, but the Cooley appraisal, as it appears in the final report, is in sufficient detail to enable an engineer to arrive at. in a general way, a correct conception of the method used. results, on my computation of the profiles, appear to be a little more than those figures on the Cooley appraisal, and from that I reached the conclusion that nothing had been added for shrinkage. far enough to satisfy myself that Cooley appraisal figures were not high enough to represent actual amount of material used.

I didn't re-compute from the profiles all of those quantities. have done so, would have taken a force of men a couple of weeks, and would have taken my time for a couple of months. Cooley figures as a basis, and my judgment as an engineer. I made this as an approximate estimate of the yardage of material in this work, and am satisfied a re-measurement of the work would show an increase of from 1/5 to 1/6 of the total yardage. I have been back and forth over the road, and have had those profiles, and feel certain, from general knowledge of railroad grading, based on twenty-seven vears' experience in construction work, that there is more vardage

per mile than I have testified to.

I satisfied myself that Cooley figures were arrived at by taking ambankment figures. The Cooley figures are divided up in various sections, and by checking any one of them from the profile it can be found out how the Cooley figures were given. rules of Cooley appraisal required the engineer estimating Afterwards, without lookgrading quantities to add for shrinkage. ing at the computations made by engineer on Cooley appraisal, but from profile computations of my own, I decided he could not have followed those rules, or added for shrinkage, and I added an additional 10%. Straight through, I have added to Cooley figures 10% for shrinkage and 7.5% for other elements, or irregular slopes, extra

grading as various points, and overhaul. The total amount added

for shrinkage is \$178,000 plus.

I added to Cooley appraisal yardage of grading 17.5%. This particular item depends on judgment, without possibility for reaching actual results, about as fully as any other figure in my appraisal. A correct estimate depends largely on the judgment of the engineer making it, and the accuracy of that judgment would depend largely

on his experience and his knowledge of that class of work.

A yard of carth coming out of a cut will temporarily make considerably more than a yard of earth in the fill; it will then settle, and we require the contractor to raise the fill. In practical construction, we take care of what is known as shrinkage in setting the stakes in the fill at a higher elevation than the final height of the fill, and then settlements will take place, and frequently it is necessary to raise and widen the banks. The shrinkage is between the line we fix for the contractor and the line to which his embankment subsequently settles to be—the profile line. We put the shrinkage on the contractor; the contractor makes his price based upon earth in place, after the settlement has all taken place.

The earth is paid for on its quentity, as it lies in the cut, as a rule. It frequently happens that earth is paid for in the fill; it is then paid for on measurements of the fill plus shrinkage. In practice, you measure all of your cuts and measure

all of your fills, in order to keep a line on your overhaul,

I uniformly allowed 30¢ a yard for cost of earth grading, as of the middle of 1911, which is my judgment of the fair price, in view of the fact that I have not classified hard pan, and have not allowed overhaul except by yard. The price is not based upon my personal experience in Upper Peninsula, as I have done no contract work there since prior to 1900, and that previously was not comparable with this.

Range of prices in past few years, depending on character of material moved, is 24¢ to 38¢, unclassified, and some contracts are higher for hard pan and lower for earth; the prices depend upon equipment used and quantities moved. Mr. Young testified, or said, that for new cut-off he had bid prices of 27¢ and 30¢ per yard. On making up his mind that the company could do it as cheaply, it was done by company, at prices over 27¢. This higher price was due to finding underground ledge of rock, which in part paralleled the line of excavation, increasing the cost. I do not know as Mr. Young's 30¢ price included rock; there are no very accurate records. I talked with Mr. Young, got his price, and confirmed it from company records. I found cost of part of new line built by the company, and that is part of my basis for 30¢.

In getting at cost of 2.4 miles of new line, I used actual cost. I assumed the earth to be moved at 30¢. From that I found the number of yards; I did so, as I had no record of the yardages; I had an approximate estimate of Mr. Young's yardage, but none of that

moved by company subsequently. So I deducted the known rock at \$1.25, and divided the remainder by 30¢, to give the number of yards. I then multiplied back, to get the cost.

I had Mr. Young's cost and yardage. Mr. Young did about one-half the work; i. e., for one track; company built the grade for second track. For both, this totaled a certain amount. Mr. Young's and Mr. Simar's estimate of rock was 6,000 yards; they had no definite figures, but used 6,000 yards. I confirmed this by inspec-

tion, without measurement.

As a basis of my 30¢ grading price, I also used my experience in contracting this class of work over past 5 or 6 years. Besides the figures on cut-off, there are numerous other figures where South Shore contracted several small pieces of work; e. g., on small contract—on Palmer and Mary Charlotte branches—prices, 22¢ to 40¢ for earth, 40¢ to 60¢ for hard pan, and 45¢ to 60¢ and up for loose rock; they were such small contracts, I do not think them a fair criterion.

With hard pan classification, price of 25¢ to 30¢, with an average of 27¢, would prevail on this whole line. Contractor makes higher price for hard pan, due to greater difficulty in moving. It is difficult to say what will develop in respect to character of earth—

whether there is much hard pan-from going over the line.

The 22¢ price was in sand country, on Deranson spur. Most South Shore contracts have been around or above 30¢. I should accept Mr. Young's statement, that grading cost over 27¢ and close to 30¢, as correct. I feel the 30¢ for grading fair, taking into account absence of hard pan classification. It is 5¢ higher than Cooley 1900 figures, and there has been a material increase in labor cost since then. Cooley price included overhaul, which is here added, as part of an additional percentage. Had each appraisal (Cooley and Riggs) been based upon known yardage in same

99 territory, so they would be comparable, my price would have been a little lower than 30¢ or his a little higher than 25¢;

mine would be relatively higher.

Cooley 25¢ price applied to entire state. So far as soil conditions are concerned, Upper Peninsula and Lower Peninsula are not radically different. Labor conditions are more difficult, teams are harder to get, and distance of hauling supplies is greater, in Upper Peninsula than in Lower Peninsula, and cost of maintaining camps and boarding outfits would be greater in the Upper Peninsula.

The 17.5% added to represent shrinkage and other items would

be affected and increased by overhead percentages of 26.5%.

I did not depreciate ballast. There is on all roads, especially those with gravel or cinder ballast, a necessity for furnishing additional ballast to take care of maintenance of track as the joints are lifted, and to take care of the ballast necessary to support what we term "shoulders"; that is, sufficient amount of ballast at the ends of the ties to hold the track to line and prevent swinging out of line with passenger trains.

The purposes of ballast are: (a) to permit drainage, (b) to furnish elastic foundation for ties not subject to rapid deterioration from storm, and (c) to hold the track to better line and grade than possible with ordinary earth. There is added to the ballast every few years additional yardage, in the nature of a maintenance expense;

like track surfacing, it requires more or less work every year, to keep it up to the standard of operating condition. I consider the cost of placing the ballast, after it is placed, like surfacing, is maintained to substantially 100% of operating condition by the large amount of

money spent upon the track in maintenance every year.

I decreased the yardage of ballast, shown in Cooley appraisal, 10%. The additional work of ballasting increases the number of cubic yards of ballast on every mile, though I don't believe you would be justified in adding to yardage per mile after you have reached a proper yardage for this class of ballasting. Ballasting is like track laying and surfacing—as long as the road is maintaining its property and spending \$400 or \$500 per mile per year in maintenance of track and ballast, I do not see how we can consider that the ballast is losing any of its value. There might be a little deferred maintenance,—that is, one mile of track might not have all the money that is coming to it this year,—but next year it will get it, and the material is all there.

There is an appreciation of roadbed due to ballasting during, possibly, the first 12 or 15 years. After the first few years, not a great amount of ballast will go into the earth. The more ballast you put on, the better your drainage, but that is about the only advantage

after the first 10 or 12 years.

After ballast has been delivered, placed and dressed, it is unquestionably in 100% condition, and I would go further, and say the same at the end of one or two years, after the track had received a second and third lift. I mean that after ballast had been re-surfaced in the course of maintenance two or three times, and on a well maintained road all of the track is gone over once a year at least, I would say that the track was in better and more suitable and stable condition than when the ballast had been first delivered, and that, while there might be apparently less ballast there, you couldn't say there had been any depreciation of ballast, because your track was really more stable and in better condition than it is immediately

really more stable and in better condition than it is immediately after it has had its first—after its final dressing up, im-

101 ately after it has had its first—after its fir mediately after the delivery of the ballast.

The road must be gone over every year; every foot of the track is jacked up and lined, put to exact line, and all the ties are tamped under. They loosen up the centers, tamp under the rails, and get that track in perfect condition; that has to be done every year, no matter what ballast material is put on, and whether new ballast is added or not. New ballast is not added yearly; sometimes 4 to 6 years elapse. Now, all of that lifting and tamping results in eventually taking more ballast under the track, and less around on the shoulders, and the only depreciation or deterioration that takes place after three or four years of such work is such mixing of part of the ballast with the earth of the embankment as comes in the handling of gravel on top of the sand bank or clay bank.

Q. And in addition to this doing something to the ballast every year, there comes a period when you must put in new ballast; that

is true, is it not?

A. There comes a period when it is desirable and sometimes ab-

solutely necessary to put in some new ballast, to take the place of that which has disappeared from the shoulders and been driven down into the roadbed.

Q. But at the time that that ballast was first put in, there was no

necessity, then, for anything else, was there?

A. No, if the road was fully ballasted, or given a sufficiency of ballast, at the time it was put in and after the final lift had been made, and after the final dressing up of the new ballast, I think we would say that the ballast was in 100% condition. Now, a year from that time after the road had received its annual re-surfacing.

in my opinion, that piece of road would be better-that

102 ballasting would be better than entirely new ballast.

Q. But there comes a time when we must put on each mile of that not less than a thousand yards of new ballast, at a cost of

\$500, within the next four or five years?

A. The time may vary, but there comes a time when it is necessary for us to put on more ballast, ranging from 400 to a thousand, and on some lines perhaps 1,600 yards—yes, unquestionably. That keeps on just as long as the railroad runs. The ballast under the roadbed proper I think may be said to go into the ground further; the tendency is, of course, to drive; the weight of the train comes directly over the track.

I have followed the precedent of Mr. Cooley and other appraisers, that, so long as the property is maintained, the labor elements in track laying and surfacing do not undergo depreciation. I think there have been some appraisals which depreciate ballast, though the general practice has been not to depreciate ballast or track laying. In 1900 appraisal, depreciation was allowed on not more than 3 or 4 small properties, which had never been re-ballasted. Ballast on South Shore was not depreciated in Cooley appraisal.

Q. The deterioration of ballast is described by the term being

worn out, isn't it-ballast worn out?

A. That term has been used, and is to some extent used, among railroad men, having particular reference, I think, to the fact that the surplus ballast necessary to maintain the shoulders and proper filling of the track has to some extent been reduced in quantity, or partially disappeared. I think that, to the extent that ballasted track is permitted to deteriorate for a long period of years after the ballasting on the shoulders disappears or is reduced in quantity,

there might be said to be some wearing out.

If the ballast goes to a point that there should be a renewal, and there is no renewal, but, on the other hand, the company continues, year after year, working over its track, using the same old ballast, it does, in the course of time, become so mixed with other earth as to lose much of its value as ballast, and in that case I should say that there was a depreciation.

Q. Well, hasn't it lost its value when it goes to a point where you have got to supplement it by something that costs, as you stated this morning, from \$250 to \$750 a mile of track to put it back into the

condition where it started from at the last renewal?

A. No, I don't think so. We started out with our assumption that

new ballast, after it had been surfaced and dressed, was worth a hundred per cent, or was in a hundred per cent condition; that is, it was new. A year from that time, it has become settled; it has gone a little bit into the roadbed, but after it is resurfaced, the track is in just as good condition and worth just as much money as railroad track, and just as near a perfect condition as it is possible to make it. Now, the same thing will happen the next year. During the period between the maintenance of 1909 and 1910, the whole track depreciates a little; some of the joints get low, some of the bolts get loose, and the ballast is pounded down a little more at one place than at another, but the repairs that are put on it keep it in safe condition, and, at the end of the general lifting and surfacing that the road receives every year, it is brought back to substantially perfect Now, after five or six years, you put on more ballast, and it is not like the taking out of an old rail, where you completely remove all of the rail, nor like the taking out of a tie that has rotted, when you pull it out and put it out on the side of the right of way and burn it up; all of the old ballast remains there, and along with that old ballast is 500 or a thousand yards per mile of additional ballast, and you bring your track-you commence, then, to

put your track into your hundred per cent condition, but the 104 condition of your track when you commence to put in this second lift is far better than it was before there was no (any) ballast

at all.

Q. With the lapse of time, and with use, a part of the useful life of the rail disappears, doesn't it?

A. The rail wears out.

Q. A part of the useful life disappears, doesn't it?

A. Yes, every year.

Q. And with ballast, a part of the useful life disappears with the lapse of time and with use, does it not?

A. No, I fail to see how you can wear out broken stones; you can

mix it with dirt.

Q. Doesn't the useful life of it disappear; that is the point?

The Master: In the position that it occupies?

A. No, it doesn't. It may get out of place; it may settle down under a wet joint.

Q. Then, if the useful life doesn't disappear, what is the necessity

of putting on more?

A. The necessity of putting on more is to replenish the shoulders, to replace that which has worked into the embankment, and to replace that which has been lost by the operations of the men.

Q. But, if the useful life of that ballast had continued the same as when it was put in, in the same condition, it wouldn't be necessary

to put more there, would it?

A. If it were not necessary to work over that ballast, it wouldn't be necessary to put over more. It doesn't wear out under traffic, as your rail does. It doesn't rot, as your tie does, and 105 whatever depreciation there is comes from the fact that you are working with it. Now, if you are spending \$600 or \$700 a year, as is the case on some classes of road, or from \$400 to \$500 a year, as is the case on other classes of road, in maintenance, in operating expenses, in maintaining your track, I fail to see how anyone can justly arbitrarily say that the value of any part of 3,000 or 3,500 yards of stone has disappeared.

Q. When you put it there, it is in position where it is useful and where it has 100% value, and where it is not necessary to put any

more there; that is true, isn't it?

A. That is true.

Q. And by reason of use, by reason of the lapse of time, it gets

away from that position, doesn't it?

A. By reason of use, and by reason of the lapse of time, it is driven into the embankment, and some of it gets away from that position, yes.

Q. And you cannot get it back to the position where it is 100% value, and where it serves every useful purpose that is necessary, can

you?

A. No, perhaps you cannot get all of the ballast back in position in which it was when it was first placed, but, on the other hand, you cannot pick out, on a well ballasted road, any mile of track and say that this mile is in 90% or 80% or 70% condition. The chances are that measurements made on any ballasted mile of this road would disclose the fact that there is substantially as much fallast as I have estimated, and on many of the miles measurement by excavation would show from three to four times as much gravel as I have estimated.

Q. That is not the question. I want to confine you to the question

of depreciation?

A. Now, my point is that there is no way in which you can determine the depreciation of stone, because your ballast is in reality nothing but stone delivered along the road. The only way in which depreciation would really come would be the disappearance of material, by the actual disappearance of ballast; you cannot say that because weeds or grass are growing up in ballast it has depreciated. I do admit that in the course of time it does disappear, but I do say that the ballasted sections of this railroad doesn't disappear to any such extent that it is possible for any engineer to come on the ground and say that 10% of it has actually gone.

The Master: By ballast, I think Mr. Wykes means ballast in position, and by ballast, you mean ballast, whether in position or out

of position.

A. There is this distinction, that must be kept in mind: The classification of accounts provides for ballast as laid down along the track. I have included in my price ballast in position, but the ballast, the stone itself, is purely an item of material, just like ties or rails, and the labor of placing the ballast in position is, in reality, surfacing.

The Master: That is where you and Mr. Wykes part company; you are talking about ballast, absolutely, which does not deteriorate.

and he is talking about ballast after it is put in position, which in-

cludes the labor, and that does include the labor.

Mr. Wykes: I don't think I misunderstand Mr. Riggs, or that Mr. Riggs misunderstands me; the only difference between us is that he, perhaps, doesn't entirely agree with what I think is consistent.

Q. Now, Mr. Riggs, you take a railroad that is completely ballasted, so its ballast is in 100% condition; take the same railroadthat is, just the ballast item-three or four or five years later, during which intervening time there has been no ballasting; is the

ballast not worth more at the time you start with your ballast 107 new than it is at the time of the lapse of 3, 4 or 5 years, when it becomes necessary to re-ballast the entire road. I wish to exclude that that for the purpose of this question the question of appreci-

ation of roadbed; I am talking about ballast, solely?

A. I think that if you would extend your period of time, and not limit it to 3, 4 or 5 years, I would answer yes. I mean, by that, that, if a railroad is built new this year and ballasting is completely finished this, unquestionably some parts of the road will show greater loss of ballast than others, and, if no renewals of ballast are made at all for a period of 5, or possibly of 6 or 7 or 8, years, I think that, unquestionably, the ballast at the end of that time would be worth less, by the fact that a certain number of yards per mile of ballast, on the average, had disappeared, or that, perhaps, on some miles su' stantially all of the ballast had disappeared or gone into the bank or had become mixed up with the earth so as to lose its character of ballast. But, if a railroad begins at the end of the second year to replace ballast, and replenishes the ballast at the points where it is most needed, and continues that replenishment, treating, every year, a few miles, I do not think that, in that case, you can say that you have a condition where your ballast on a mile of road is worth less than your original cost of ballast, because, when you replenish your ballast on a mile of road that already has three-quarters to four-fifths of the original ballast there, you certainly are starting with a better condition, and your new 100% condition is certainly a better condition, as far as the track is concerned, and as far as the usefulness of that ballast is concerned, than it was originally.

Q. You haven't answered the question of whether a road is worth as much immediately before the period of new ballasting as it is immediately after the last period of new ballasting?

A. I could conceive that, if no ballasting was done on a - road, the ballast would be worth less at the end of a period of years than it was when first new. Now, this question assumes that a railroad is ballasted, permitted to run for a period of years, and then completely re-ballasted. No such condition as that prevails.

Q. Get it down to this point: Apply that question to a mile of ballast on a railroad; you will admit that a mile of railroad is bal-

lasted at perhaps reasonably stated intervals?

A. Yes.
Q. Would a mile of railroad, so far as the item of ballast is concerned, be worth as much immediately before the period of new ballasting as it would immediately after the period of old ballasting? A. Well, now, there comes in the question of what kind of a mile you have assumed.

Q. Any kind of a mile that is ballasted should be ballasted again, I don't care, of an existing railroad that has gone for a reasonable

period of years?

A. I think that, if the track upon a mile of railroad is maintained to su' stantially perfect line and grade, the adding of new ballast and again putting that track in perfect line and grade would make no difference in the smoothness of that road, or its value as part of an operating railroad. The placing of the new ballast would give an additional yardage.

Q. And an additional cost value?

A. And, to that extent, might give it a material added cost value.

Q. So it would be less value immediately before you had to spend

from \$250 to \$750 on that mile for ballast?

A. Unquestionably, the adding of from \$250 to \$750 worth of ballast per mile would put the road in better condition, and the road should be better, to the extent that there was that

much more ballast on it. The whole thing is so intimately tied up with the condition of the particular piece of track that was under investigation, as to its maintenance and as to whether that mile or that section has received, during the year or during the period of years, its due share of maintenance. There may be deferred maintenance on the whole track; that would affect the conditions of the track ballast, as well as the track laying and surfacing.

Q. Deferred maintenance would mean a deterioration which

should be depreciated, wouldn't it?

A. No, not necessarily. I think I can illustrate that better by another class of property than railroad property, because railroad main line property per mile should receive substantially its due share of maintenance each year. But emergencies often arise where in one year a certain stretch of track will receive more than its share, other track being neglected; the next year, the section that has been neglected will receive its share, but, where the general average of maintenance per mile of road indicates that there is no neglect, I don't think there should be any depreciation, even though there is a deferred maintenance on some particular miles of road.

Q. And even though that would require a considerable expenditure to bring it up to full serviceable condition, to the best condition

it could be in?

A. If your road is being neglected, and if your maintenance accounts show that you are not spending your money on your track, to maintain—you are not spending a normal amount of money, then, unquestionably, your whole road is depreciating; but, if you are spending the money, and you are not increasing the value of your

property by reason of these expenditures, that is, if you are legitimately maintaining your property, and are making no additions to the property account on account of those expendi-

tures, I don't think it should depreciate.

The Master: Isn't the sum and substance of it that whether you are re-ballasting or not will add to the value of the road, depends on whether the re-ballasting is needed or not?

A. Yes, and also the fact that the re-ballasting is a continuous proposition, that there is some of it goes on every year.

The Wisconsin appraisal depreciated ballast.

From my information and investigation, I can say that the ballast on the South Shore has greatly improved since the Cooley appraisal, and since 1907. More or less work has been done every year, and the physical property of the company bears evidence of the fact that there has been a continual improvement in the way of extending the ballast, and putting St. Ignace ballast and stamp sand in territory that was formerly ballasted with other material. My personal opinion is that a very considerable mileage of plaintiff has been ballasted since 1900, and that the work has been so extensive as to amount to practically complete re-ballasting.

My recollection is that there were no charges, or very small charges, for ballasting, to capital. I made no attempt to adjust any of the charges as appearing on plaintiff's accounts between operating expenses or additions and betterments. There is a charge to additions and betterments for ballasting on the new double track, but, where they were re-ballasting or ballasting existing line, I remember having found no charge to construction or betterments due to ballasting. I went through the additions and betterments accounts for 10

years.

There were varying prices on contract work of the South Shore, for small jobs of from 4,000 to 14,000 yards in each contract: 1904, earth excavation, 26¢ per yard, and hard pan, 40¢ per yard; 1907, Mary Charlotte Mine, earth, 40¢, hard pan, 50¢, mine waste, 60¢, loose rock, 75¢, solid rock, \$1.35, and overhaul, 2¢ per yard station of 100 feet, with 600 feet free haul; 1909, Volunteer Mine, earth, 35¢, hard pan, 50¢, and overhaul, 1.5¢ per yard station.

For Mr. Young's statement of cost of cut-off, he estimated 6,000 yards of rock and 154,000 yards of earth, with a total cost of \$45,764.26, including both rock and earth, no separation being made. That price included charges for rental of equipment, supplies, and apparently all elements that go to make up the cost of the work; the cost was 27.5¢ or 28¢ per yard. The second track grading was done immediately after, by South Shore; the cost was \$10,744.78, and I estimated the yardage by dividing the total cost by 30¢. Based on Young's price of 27.5¢, the yardage would go up a little. The \$10,744.78 is simply the pay roll distribution, with no allowance for train service, rental of equipment, supplies, engineering or supervision.

In general, South Shore charges include nothing for engineering, supervision, or overhead expense on construction work, as they follow literally paragraph 15 of I. C. C. rules for additions and betterments, to the effect that no charge shall be made to additions and betterments for services of a general officer of the company or employee regularly engaged in other work and who gives but partial

time to the particular work.

On ties, I figured percentage of condition at 60%, on inspection and my judgment as representing average condition of ties. I would say that the percentage of condition on South Shore ties is higher than 50%, without hesitation; I do not believe I have seen a

mile of main line road on South Shore where I would put the tie percentage as low as 50%. On tie life, I would take Young's experience here, or accept his judgment, because there is, or may be, quite a marked difference between the tie life here and in Lower Peninsula. On the supposition of tie life of 9 years and renewals on the basis of 11 years, as I figure it, the theoretical percentage would be below 50%, but I don't believe there is any main line mileage of the road in which the physical condition of the ties, as appearing from inspection, would be as low as 50%, and that certainly would not apply for an average.

My inspection was from moving trains, and, at points, where I got off to look at bridges, and in walking through yards. It is true that it is difficult, in going over a road on a train, to form an absolute opinion as to ties in the track for a long time; this and last year's ties can be picked out, but after two or three years it is difficult to dis-

tinguish from surface appearance.

Many ties that have been in the track for years are cracked, dirty, and appear to be in bad condition, but may be perfectly sound, and good for several years of service, while I have seen bright, nice looking ties that would not stand a hard blow without showing that they were affected by heart rot or otherwise. The section boss examines the tie he is to take out, carefully, and goes over his particular 5 or 6 miles, hundreds of times a year.

When I made inspection, all the renewals for the year were in; they are made in the spring, as a rule. Where a railroad is being ballasted extensively, tie renewals are super-normal, due to the fact that, in lifting the track for a 6 inch raise of ballast, it is necessary

to take out ties that would be good for several years.

I do not remember that Young fixed 55% as his percentage of depreciation. He stated that in supporting the proposition that no tie in the track should be depreciated below 50%, because when it got to the point where it must be removed there was a new tie on the ground to renew it and the two, taken together, would be 55%. It is mathematically true, that where the cycle is being carried out, and if the life be 9 years, and renewals are made on the lasis of 9 years, you would get a 50% condition; but, as a matter of

actual condition, you would fix a higher percentage.

I spent more time in inspection than was spent by anyone in 1900 State appraisal. My inspection was much more thorough than was possible in 1900 appraisal, because of weather and inspection conditions, and I had the company records with me; I believe my inspection enabled me to place substantially accurate percentages. I think two competent engineers might vary, on the same inspection as I made, 10% or 15% on condition of rail; I do not think competent engineers would fall under my percentages. The variation might be 5% over or 5% under me; I think the variation would be up, rather than down. I should be surprised if you did not find quite a number of duplications in my work, and, in my mind, a detailed examination of the property will disclose omissions as numerous as the duplications.

On the cost of installing the switches, I think I have seen no en-

gineer's estimate at a less figure than \$25, though I have seen them running to figures I considered excessive—\$80, \$90 and \$100.

There is frequently variation in the estimates of engineers on labor items of railroad standard structures, such as switches, or installing crossings, or putting in highway crossings, or installing railroad cross-

ings, due the different experience of different men in dif-114 ferent conditions under which they have worked, that might cause figures 25% to 30% lower running to 25% to 30% higher than those I have used.

Q. That variation might extend further, it might extend into other railroad structures, might it not, small station houses, section hand houses, and these smaller structures that we find all along the road?

A. Yes, I think that that is true, that in arriving at a figure to represent a fair cost of reproduction of such structures an engineer will adopt one of two methods; he will either use some unit of square foot or cubic foot price, and apply that to buildings, or, to be more exact, he will measure up the material in the buildings and make detailed estimates, and, in either case, there is likely to be considerable variation.

Q. Even though the same method is pursued, the two different engineers would vary somewhat, at least so far as the labor items were

concerned?

A. Yes, I don't think that variation would run so much in the case of labor items involving large amounts of timber, where prices of \$8 to \$10 a thousand are used, based on a wide range of experience, but on minor structures, such as hand car houses, or oil houses, or pumping stations, there might be a very considerable variation in an estimate, and, equally so, there might be a very considerable variation in the actual labor cost of two similar buildings.

I think that if it were possible to take the time for another appraisal, and go into minute details, it might be possible to still further eliminate or reduce the contingency item, on some of the schedules. I continued certain of the items of overhead charges without depreciation, because they are legitimate, proper and neces-

sary expenses that any railroad must incur in the original construction of its property. It is likewise necessary to incur the expense represented by the difference between my present physical value and fair present reproduction columns to reproduce the property; to reproduce the property, they must make an expendi-

ture equal to the cost new of the elements.

I added 2% for engineering on equipment, which was not added in Cooley appraisal, where no allowance for engineering of any character was made on equipment. A considerable portion of the expense of engineering on equipment finds its way into the operating expenses. So long as the equipment continues in existence, the item of engineering would continue without depreciation.

For legal expenses, I used the percentage almost universally used in railway appraisal work. For several years, I have been securing data on all classes of construction work, and I find the item has a wide range, depending on the character of the property and its location; from data apparently reliable I find the percentage to range from .38% to over 4%. I have not found complete and satisfactory records of new railroad construction that would enable me to say anything higher than .5% would be proper, though I have found them running from slightly less than .5% to over 1%, since proraulgation of the I. C. C. rules. The item is incapable of absolute determination, being in the same class as engineering; it does not include costs of right of way purchases; that is something additional, which inheres in value of right of way.

In all of Cooley's appraisals, he has used 4% for engineering and .5% for legal expenses, and Wisconsin, Minnesota and South Dakota used 4.5% for engineering and legal expenses, while Wash-

ington, on Nothern Pacific, used 5% for engineering and 1% for legal, and, on Great Northern, 3.5% for engineering and 1% for legal; Nebraska used .5% for legal. Other appraisals have used a higher percentage, though I cannot say just what it is. Wisconsin, Minnesota, South Dakota, Washington, and Mr. Hogeland for railroads in Nebraska, have followed Cooley precedent, and applied legal percentage to roadway and structures items, excluding equipment. Mr. Hogeland, on C. & N. W., used .5% for legal, as applicable to all expenses. I have assumed four years of construction of South Shore, and allowed \$21,000 plus per year for legal expenses.

Legal expenses would consist of the services of attorneys in connection with the organization of the property, the incorporation of the property, the services of attorneys, and law expenses, in connection with the construction of the property, beginning from the inception of the project, to the final completion, involving all legal services in connection with contracts for construction, contracts for

purchase.

There is more law business connected with a railroad after than during construction. The ordinary property of this class spends, annually, a large sum, and in case of large properties there is infinitely more money expended per annum, in connection with the operation of the property, than there is in any year during construction. Those items during construction would be, first, as on every property, a considerable amount of legal service in connection with personal injury suits and with damages to property due to fire and wreck, to loss of property due to shipment of goods, etc. There is a very considerable amount of the time of the legal department taken up in connection with the matters of taxation and the various relations of the corpora-

tion and the State, and also a very considerable amount of time given to itercorporate relations between the different rail-road companies, matters of passing upon the validity of various contracts and agreements; also prescribing forms in the relations with Interstate Commerce Commission and State Railroad Commission, and in relations with their own security holders. In some cases, the legal expenses would be much higher than .5%.

Q. If it were indicated that the disbursements of the South Shore for a single year—say 1910—for legal expenses in Michigan had been \$5,174, and that that is about the high mark, it doesn't go much above that, wouldn't you think it a possibility that you may have gotten your percentage a little high for this particular local condition?

A. No, assuming the correctness of that figure, it would indicate rather exceptional freedom from trouble in operation, but I cannot conceive of any condition so favorable as to permit the building of a railroad across the state, and involving a total expenditure of 15 to 20 millions of dollars, where it would be possible to get out for less than \$85,000 during construction of the railroad, especially during the period of grading and track laying. My own experience has been that it required the almost constant attendance of attorneys, to adjust the difficulties that arose with adjoining land owners, the owners of property in the city, and with other railroads, due to the upsetting of conditions that formerly existed, the interference with other classes of business.

I do not suppose it would be possible to ascertain the real cost for legal services in construction of this line. Following out my theory of .5% applicable to the whole property, I would not expect to find any material increase in legal expenses in the expenditure of a large sum for building an ore dock; I do not think, following out my

theory, that, when ore dock No. 5 was constructed, the legal 118 expenses should have jumped to .5% on the cost of that ore dock, as the expenses due to fixing the right to build on that location, securing establishment of harbor line, and settling disputes with adjacent property owners was all incurred at a prior time, and this dock was a replacement of the occupied site of ore dock No. 3. In large measure, the rights to build and maintain an ore dock on that location were, and are today, established, so far as the site of ore dock

No. 1 is concerned.

I would not imagine there would be very much legal expense in connection with installing a particular dock that would require legal services—possibly, the approval of some contracts. My percentage is .5% upon the entire cost, and is not assignable definitely to any ore dock, depot building or particularly heavy mile of grading. If the ore dock had not been built, the amount would have been less, but 1 am of the opinion that percentage method is as fair a method as is possible to arrive at these elements of cost. Assuming ore dock No. 5 was not there, it would affect my figures \$2,480, less figure placed on dock No. 3. In the event of the building of a new dock, I would not expect the legal expenses to go up in that proportion, as the rights of the company had been established by the expenditure years ago.

In the year, recently, when they bought, say, a half million of equipment, it would be difficult to say whether legal expenses ought to have risen appreciably in that year, as it is difficult to attach any part of the legal or general expenses to a particular group of items, or to determine how much legal or general expense is properly assign-

able to those items.

When equipment is added, on my method of computation, for the purpose of appraisal, the value of the total property goes up so as to include .5% of the value of the equipment for legal expenses;

119 I have no doubt that the general expenses of the property, as charged to operating expenses, go up.

Q. Why not the legal expenses, then?

A. I cannot say; I don't know anything about the work of the legal

department. I never have made any analysis, and never have noticed the legal item over a period of years, but this is a fact, in every railroad, that there are a large number of employees whose entire activity is devoted to the creating of new properties, the replacement, additions and betterments, whose services wouldn't be needed by the company if the company were not growing and increasing its facilities.

The cost of their services goes into operating expenses.

If the company is increasing its property from year to year, say at the rate of a million a year, as is the case with some of the companies, that very fact causes an addition of general offices and clerks, and of employees and of traveling expenses, that directly have to do with this increase of property value. In order to determine the amount of money that goes into the property properly, all of those items should be divided, and then he devote one-half of his time to the building of an addition to the property, his time should be prorated, if you are going to arrive at the actual cost of the new property, but under the I. C. C. classification that is forbidden, so that it results in an increase of operating expenses. If his time was prorated, you could then get a more true figure of the actual cost of the additional property.

The services of employees would be charged entirely to operating expenses, unless the employees were specifically on that construction

work all the time.

The Michigan 1900 appraisal used 3% for interest, assuming a rate of 6% per annum, and a period of construction of one year. In Minnesota State appraisal, a flat percentage of 4% was applied. I cannot say that I have included something like 20% by named percentages for what was included in Chicago Traction valuation at about 10%. The total of Chicago overhead percentage ran to something like 17% or 18%.

I added in this appraisal for interest on equipment. The interest which is actually paid on equipment would be but a small percentage, due to the short time before completion that the equipment comes to the line; but other items, such as land, grading, and track construction, are in place much more than one-half the time allowed

as the time of construction. My percentage is an average.

A three year actual construction period would be required on South Shore, and four years from commencement of incorporation would be necessary; it would be possible to put any part into operation so as to materially decrease interest. The assumption of the Cooley appraisal, that all the railroads of the state, constructed in sections, could be completed within a year, was a violent one, and entirely erroneous. I don't think 3% for interest represented the judgment of the engineers on the work; few of them had given much thought to the subject, or had had to do with organization and financing of properties. I know of no railroad or system built and put into operation inside of a year. I was engaged nearly 4 years in building 23 miles.

The shortest time of construction I know of was the Santa Fe extension from Kansas City to Chicago, 440 miles, in 3.5 years from when they began buying right of way. I constructed 100 miles in

Iowa in 13 months actual working time. I don't know about

121 the time taken, there, in organizing and financing. This property would take at least one year in financing and getting

right of way.

On 12 or 15 miles, Marquette to Ishpeming and Negaunee, assuming construction of main line, mine branches and docks, to make property available for earning, 3 years is a reasonable estimate. There, the land and grading would be expensive. They could begin to earn revenues in 3 years. In my computations, I have used a 3 year period, but, upon the whole line, a year would be taken in work preliminary to construction.

I accepted Delf's figure of \$240,000 as working capital and bills receivable. I think he deducts accounts payable; I told him that was my practice. I do not know as he actually deducted those.

Ordinarily, no fund is created out of capital for stores and supplies. Material on hand at the end of construction appears in stores

and supplies.

A road reaches a seasoned condition in about 12 years. The first two or three or four years of the life of a new property, if that property was a passenger road, there would be considerable heavier expenses due to the seasoning of the roadbed, the settlement of the embankments, the washing down of the new slopes and cuts; there would be less expense in the way of renewal of ties, rails, etc. There should be no tie renewal, except to take the place of those that were broken. At the end of 7 or 8 years, the tie renewals would be

heavy—perhaps above normal.

My percentage for contingencies averages 7.9% on items 1 to 36, varying from 5% to 10%. On construction items, my overhead percentages aggregate an average of 21.9%; on equipment, 19.9%. As certain percentages are figured upon certain of the previous percentages, the overhead is 22.8% of the physical schedules and 18.1% of the grand total of the value for Michigan. Overhead percentages allowed in other appraisals are:

Name of appraisal.	Engineering and legal.	Interest.	Con- tingency.	Organiza- tion or general.	Total.
S. Dakota, 1909	4.5 .	3.0	5.5	1.0	14.0
Gillette, Wash., Nor. P.	acific 6.0	5.0	***		
Wisconsin, 1903	4.5	3.0	5.5	1.5	14.5
Wisconsin, 1908	4.5	3.0	5.5	1.0	13.5
Morgan, Minnesota			5.0		****
Darling, Nor. Pac			10.0		
Berry			10.0	***	
Hogeland, Nor. Pac			10.0		****
Cutler, Minn. & St. L			5.0		

I have not made computations that would show the exact percentage upon the total appraisal. Some of these items were not applied to all items of the schedule. In recent years, Wisconsin has, in a number of appraisals, used a flat overhead of 13% or 13.5%

I have endeavored to make a careful investigation of South Shore; I have been handicapped by lack of time and inefficient records, but I believe my report reasonably free from error. I believe I have spent more time and gone into more detail than was done on any of the Michigan valuations. I had full co-operation of the railroad and its officers, and full access to its records. My inventory, in many regards, is more complete than the company ever had before.

On grading and some of the other schedules, as buildings and 123 structures, it would be possible by a re-survey to make a more

accurate inventory than I have made.

My attempt was to make as complete an inventory as time would permit, and furnish as accurate a valuation as it was possible to furnish at the expenditure of a reasonable amount of money. A re-survey of the road could not have been made at an expense under \$60 to \$70 per mile, which I did not feel justified; such survey, while not capable of giving exact figures, would have disclosed substantially correct figures, and obviated the necessity for use of estimated yards per mile in sidetracks and other points. It would not obviate the use of estimated figures, to take care of overhaul and some other items.

So far as the contingency element applies to the items of difficult construction, bad foundations, expense due to construction in the winter, or weather conditions, or delays to traffic on account of construction or high unit prices by reason of causes that are not now capable of determination, it still leaves a large element of contingencies, and I think that it is unquestionably true that it is fully as difficult, if not more difficult, to arrive at a correct inventory and an accurate estimate of existing property, that has been in existence for many years, than it is to make an estimate of the cost of several hundred miles of standard construction where surveys have been made.

Allowance for contingencies was intended to cover (a) error of inventory, (b) cost due to difficult construction, and (c) cost due to weather conditions, all of which are in South Shore in as large a measure as in property about to be built. I have never known a case where cost of construction did not run in excess of estimated cost as a whole, and I always allow liberally for contingencies,

I have endeavored to eliminate all elements of contingen-124 cies from the detail of my schedule, except where, in earthwork, I used the Cooley figures as a basis, and there I have added percentages. I think the figures I have given for earthwork actually

under quantities that would be disclosed by re-survey. On particular structures, my experience has been that, when work was finished, some of my structures have underrun and some overrun the estimate 10%.

An engineer may make the most careful estimates on the actual physical construction and be substantially correct, and he may carry out that work, and often engineers do carry out work and get comfortably within their estimate of the cost of doing the physical, but other items entirely outside of their control come in on every job, to a greater or less extent; that must be classed as a contingency charge.

Other items of contingency would - extra expense due to (d)

demurrage, (e) material yard charges, (f) strikes and labor troubles, (g) securing labor, and (h) change of plans.

My article, read before the American Society of Civil Engineers in January, 1911, comprised my views at that time. This article

contained the following:

"The Charge of Ten Per Cent. for Contingencies.—Perhaps no single feature of the Michigan appraisal of physical property has been so generally criticised as the charge of 10% of the entire estimated cost, including all the percentage charges, to cover 'contingencies.'

"At the time the first appraisal was made, the writer was not at all satisfied that such an item, in such amount, should be included. The reasons advanced were so strong that it was done, and the writer's subsequent work has fully convinced him that it was proper

and justifiable, because:

(a) The conditions under which this particular inventory and appraisal were made, as to time and lack of co-operation of the componies, made it practically certain that some items of 125
 value were missed in the appraisal, such as station and misses

cellaneous equipment, frogs, switches, track structures, build-

ings owned by the companies and occupied by others, etc.

(b) That there were many and large elements of physical cost not ascertainable by a physical inspection, such as deep foundations, many thousands of yards of earth in swamps and sink holes (a very general condition of roads in Southern Peninsula), concealed classification due to growth of grass or washing of banks, and many other cases of work actually done, invisible after a lapse of years. The writer knows of many such instances on property which was in his charge many years ago; in several cases there were expenditures of from \$20,000 to \$50,000 which are now entirely invisible to an engineer passing over the line.

(c) The failure on the part of railroad companies to keep anything like a complete history of construction operations, and the changes of operating officials from year to year, cause the loss of record of practically all the expense due to extra hazard and risk which the construction engineer provides for by his 'contingencies.'

(d) The inclusion in operating expense, every year, of sums which are properly construction, and which, if added to unit prices of construction work, would cause the cry that such unit prices were too high. For instance, the appraisal estimate on earth was 17 cents per cu. yd., with no allowance for overhaul. Very much of the grade in the State had actual costs far in excess of this figure, and practically every road spends a large sum annually for the first four or five years, which is charged to operation but is in reality a part of the cost of completing the roadbed.

(e) No account was taken of appreciation of any of the elements entering into a road. There is no doubt that roadbed, for example, does appreciate, due to ballasting and track work. These items go far toward accounting for the contingencies item on an old road such

as the Michigan Central.

(f) There is a considerable amount of cost, which cannot be taken

out of capital, where facilities are abandoned or line or grade changed. These changes are common to all growing roads; they are due to the demands for greater traffic; they are necessary to the welfare of the community served; they are often made at points where no charge of defective design will apply. They might be termed expenses due to the development of the State, and, in the development of the railroad business, they were absolutely necessary for its present standard of efficiency. They are incapable of exact and definite determination, and must of necessity be included as contingent expenses.

"In the case of a new road, where the exact cost is ascertainable, the records have been fully kept, the original plans are on file, and the history is fresh in the minds of the officials, it will be readily admitted that a charge for contingencies in large amount would not be justifiable; but, in the case of the Michigan Central Railroad, a line more than 50 years old, which has changed, rebuilt, and added largely to its property; in the case of the Pere Marquette Railroad, made up of the union of a dozen lesser properties, without any complete history; in the case of dozens of little lines, without maps, profiles, or records, some such allowance is fully justified and proper.

"The experience of the writer, in the years that have passed since these appraisals, leads him to the opinion that the difficulty of estimating values of an old property are such that in many cases an appraiser might add, with perfect propriety, even more than 10% for

the contingency item.

"In computing overhead charges, no allowance was made for working capital, and no addition to the physical valuation was made to

cover any such element as 'going concern' value."

I fail to see where it can be said that there is any greater value to the public by reason of the fact that, in the course of railroad construction, strikes occur, or delays to material, or even damages by reason of storm or wash-out; but, in the building of every property, expenses of those kinds and of similar nature are incurred, and the men who are putting the money into the property, to create the property, are compelled to furnish that money and invest it in the property, and it appears to be a properly chargeable expense incident to construction, and to be properly a part of the capital.

The strike and delay, involving demurrage charge and a dozen other items, are misfortunes that are incident to the building of railroads, and, no matter how carefully the organization may have been planned, they are bound to come in, in some form or other, to a greater or less extent, before you get your railroad built; you cannot

avoid spending money—more money than you ought to spend, perhaps—for items of that sort, that are in the nature of a misfortune. A strike is a possibility; certain other elements

of contingencies are probabilities.

In theory, my item of real estate and right of way includes original cost, additional percentage, and the cost of purchase. The items are fully described in my inventory. I know of no further acreage that should be included. As bearing upon the question of whether

contingency items should be allowed upon the real estate, the contingency item is not assignable to the individual items, nor in the same degree on all items, but is a proper allowance on the whole appraisal. On real estate, a contingency due to the judgment of different men in fixing values must properly be added. If I were making estimate for the purchase of right of way of 6,000 acres, I would, after fixing my values with the utmost care, add a large contingency item.

On real estate values, there is likely to be a wide range of opinion, up and down. It is substantially impossible to separate the contingency item and apply it to the different schedules; it is much greater on some classes of work than the 5% or 10% I have figured, and the effect of its being smaller on some would make a much heavier per-

centage on others, assuming it were apportioned,

If you undertake to apportion contingency among various items, you must, on some, use a very large percentage, far in excess of anything that has been named; and, over and above all the individual schedules of physical property, are elements of cost that come in by reason of building the whole property, that are not assignable to any of the schedules.

Contingencies on my valuation, figured on Cooley basis, would be approximately \$545,000 more than I have allowed; I have 128 allowed \$1,196,460. Contingency on my totals, on Cooley basis, must be \$1,744,502, and he allowed, in 1900, \$1,029,845, and in 1905, \$1,110,614. My figures were based upon

increased prices and additional property.

All of my prices were proper for 1911, and were in no sense (with small exception) the average of a period of years. My labor prices were figured as of 1911, and grading at 30¢ was a 20% increase over Cooley 1900 prices, and very closely approximates increase in wages of 1911 over 1900. It would have been a fair price as of 1909 and 1910. On grading, I did not attempt to make a mathematical computation from any year's figures. I had contracts of 1907, 1908 and

1909, and knowledge of contract prices of 1910 and 1911.

I made no special examination of the company records for unit costs on buildings, as I found the company had not included in their costs, as reported in their additions and betterments, items of transportation of men and materials and numerous other charges that properly should have been made against buildings. In a great many of the buildings, there are omissions of quite considerable items, and the accounts, as made up, report the actual price of material, without any of the cost of handling or transportation, plus the actual labor cost of men working on the buildings.

I have no doubt that in many of the older buildings the original cost was materially less than my cost of reproduction, and in many cases it might be found that the present physical value is equal to, or in excess of, the original cost. In the last few years, since additions and betterments accounts have been kept, new buildings and replacements have been kept separate, and many are shown in company's additions and betterments accounts. For those, I could get a figure that purported to be original cost, while others show widely

different cost, due to omission of items undoubtedly charged 129 to operation instead of construction. Within my experience in this state, there have been no such sudden or violent fluctuations up or down as would materially affect the cost of the entire property. There has been a steady tendency, in the past 20 years, for prices to go up; there have not been violent fluctuations in that period in any class of material entering iargely into permanent way, with certain exceptions.

In structures, obsolescence was taken into account by me to a limited extent only. That is, where a structure built for a superior purpose is now used for an inferior purpose, it was included at the present value for its present use. That applies only to a limited number of minor structures; other than that, I did not take into account, or

use, obsolescence in figuring my rates of depreciation.

I have not taken it into account, in any appreciable extent, in bridges, although it might possibly be argued that there was an element of obsolescence there. As long as it is doing the work, in a satisfactory manner, of an up-to-date structure, that would take its place at a greatly increased price, and without excessive maintenance, I do not believe that a company should be compelled to throw into the scrap heap a bridge or other structure and replace it by something more expensive.

In many of the structures, there is no obsolescence. Some structures, such as wooden bridges, can be maintained safely indefinitely and held to 50% condition by replacements; they can be held, by reason of annual maintenance charges, in condition of, substantially, 50%, year after year, and I do not see how an engineer is justified in placing a lower percentage of condition or value because it would be

nicer to use a different character of structure.

The capacity or strength of some of their old iron bridges is limited, and some of the old wooden bridges could be strengthened for increased locomotive weights and cars with very little money. Most of South Shore bridges are of a type that we would not rebuild today, if we were to build the road new, as they are much more expensive than they were when originally built; and, in the case of many of the smaller ones, the expense of putting in a re-inforced concrete slab, or an arch, would not be in excess of the cost of replacing in kind, or building new, and, to that extent, they are obsolete. They are a form of bridge that was used on practically all the pioneer railroads of the west, a few years ago.

I don't know that I would continue to maintain those structures indefinitely; you reach a point with some of them where the annual maintenance would probably justify new construction. This is not due so much to obsolescence of the type as to the fact that lumber and labor costs have gone up, and having such a bridge involves tak-

ing out and replacing members every year.

I have not, in any case, ignored the structure in existence, or depreciated it beyond average depreciation of that class, because some other type of construction might be more economical of maintenance, or might be installed to perform the work equally well, at less cost.

I had recourse to very few sales in Marquette, and my judgment

was fixed, in the main, by inquiry, as to asking prices, value and sales, supplemented by examination of the property, by the values of frontages as given in the Cooley appraisal, which were carefully made by a special appraiser. My highest price for frontage, except on the main street, is \$60 per foot. I had no sales on Front St. from which

to fix value of \$450 per foot.

131 On south line, two tracts are crossed by the railroad, and I included about 13.7 acres; I should say that the purchase of the entire of both pieces would be necessary in building the right of way across the two tracts, and that the payment of abutting damages would more than equal the value that I have placed upon the entire land. This property is so cut, and left in such shape, as to be in the class where the railroad company would be compelled to purchase the whole, as the cheapest way out. are about ten acres outside the right of way, divided into three triangles.

On water front, I had information as to the asking price on three or four pieces of water front property, one piece near Standard Oil and one around beyond L. S. & I. depot; I do not recall that I heard

of any sales in a number of years.

Spring St. produced is used as a driveway or approach to the ore dock, and by the general public, and by employees of the company. If I had known that the company had reported that 40 feet at \$1,-100, I do not think I would have used it or been guided by it in placing values at Marquette. (Witness' value, \$20,000.) While not used as a right of way for track, it is used as a thoroughfare. There is no public street through there, and I would say that it is essential to the company's business to have one. It makes the lowest grade approach from Lake St. to Front St.

My information is to the effect that it was vacated and the company acquired it. I don't think it would have made any difference in the value of my land at North Marquette, at \$200 per acre, had I known that the company, in its sworn report, fixed a price of \$700 for 22.29 acres there. Water front in Marquette is used by Standard Oil Co. and a number of industries located on South Shore tracks;

I know of no other considerable uses. There are more or less fishing boats and minor boats, but nothing that would 132 be considered a use of the water for docks, wharves and other

improvements.

Q. (South Shore occupies, according to witness' figures, 4,150 feet of water front.) Assume taking away this railroad and its structures, leaving nothing on water front but Standard Oil, using a small parcel, and small industries mentioned as connected with railroad and serving railroad purposes; what demand would there

be to fix any value for this water front, at your figure?

A. The availability of this land for ore dock purposes, and the fact that it can be reached by direct line, would, in my judgment, bring it on the market for railroad purposes within a short time. The fact that it is now occupied by a railroad, shutting off access of other railroads, is a controlling factor in their having been no other sales in the vicinity. Remove the condition now limiting the

availability and use of Marquette water front, and the most valuable water front property in Marquette would be put back on the market, and, with two other railroads reaching this city, as now, it would not stay on the market very long. Its peculiar adaptability to transfer ore from cars to boats, and its location, on an improved harbor and in immediate business center of best city in Upper Peninsula, are elements which give it a real value.

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On November 7, 1912.

Riggs, recalled by plaintiff.

Further direct examination.

By Mr. Butler:

Complt.'s Ex. 49, Riggs, is an apportionment of property between the different classes of service—freight, passenger and common

or joint.

The main line and second track mileage was allocated to joint freight and passenger, and is so used, except from Humboldt to Republic and from Bessemer Jct. to Bessemer, which is not operated regularly by passenger trains. That was included in common property. Branches, amounting to 54.87 miles, were assigned to freight. Passenger car storage tracks and tracks used for washing passenger cars were assigned to passenger. Main line passing tracks, and those leading to shops and roundhouses, were assigned jointly, as common. The great majority of sidetracks, being to freight houses, spurs to mines and industries, tracks to ore docks and mines, and for storage of freight cars, were assigned to freight.

The separate schedules of Complt.'s Ex. 1, Riggs, pertaining to tracks were assigned as were the tracks on which the items occurred. Frogs and switches were divided in accordance with sidetrack schedule, switches to a track, if commonly used, being assigned to common service, and, if used in freight or passenger, being assigned according to the use. Exclusive freight buildings were assigned to freight, exclusive passenger buildings to passenger, and joint build-

ings to common.

Passenger-train equipment was assigned to passenger, and freight-train cars to freight. Miscellaneous equipment, such as snow plows and work equipment, was assigned to common. The ferries, steamships and locomotives have not been allocated, as many of the locomotives are not capable of definite location between passenger

and freight, the same locomotive being sometimes used to haul one class, and then the other. It might be possible for officers of the road, with complete information, to make a fairly definite allocation of locomotives. This would be difficult for one not familiar with the actual service. The records of each locomotive service might be examined, and fairly accurate allocation made. Some of the locomotives may have drawn mixed trains or handled short local passenger trains doing more or less work in switching. The mixed train mileage of the road is very small.

Terminals are allocated in the same manner as other properties.

The International Bridge is used by both passenger and the freight services.

The overhead items, being percentage additions, were computed on the amounts apportioned to passenger, freight and common, so passenger service bears its percentage of them.

The results of Complt.'s Ex. 49, Riggs, show:

How assigned or allocated.	C. O. R.	P. P. V.
Passenger	\$507,665	\$377,133
Freight	5,557,099	4,184,647
Common	13,134,341	11,570,303
Common assigned to Passenger (48.28%)	6,341,260	5,586,142
Common assigned to Freight (51.72%)	6,793,081	5,984,161
Total Passenger	\$6,848,925	\$5,963,275
Total Freight	12,350,180	10,168,808

The common property has been assigned between the two classes of property on the basis of revenue train miles for 1911. The revenue train mileage is all made on the main line and other 135 tracks used for both freight and passenger trains. The switching mileage, made over main line tracks, spur tracks, and tracks not jointly used, does not go into revenue train mileage. Much switching mileage is done on tracks used in both departments. I am of the opinion that the revenue train mileage is a proper basis for apportionment, as the revenue train mile is the unit of operation, both freight and passenger, and the common property and its maintenance are affected about in proportion as the train mileage.

The heavier and larger units, made up of freight trains, have a certain effect in wear of rail and life of material, but 'that wear is due in large measure to the fact that curves are elevated for faster moving passenger trains. The larger number of sidetracks used as passing tracks are necessary, because of the more rapidly moving passenger train units, and it would be difficult to fix any definite amount of money or proportion of maintenance of the property assignable to the freight service and not in any way affected by passenger service.

The revenue train mile basis seems to me as fair as any, and gives substantially the same results as revenue locomotive mileage basis. I believe it more fair than car mile basis, as the locomotive has more effect upon the physical property than the passage of any individual car. It might be possible to use a car mile basis, a locomotive mile

basis, or a revenue basis.

In my opinion, the same reasons support the propriety of the use of the train mileage basis for the division of maintenance of way and structures items of expense as for apportionment of value between the two classes. In it, weight is disregarded, the lighter pas-

senger train being given the same efficiency, as a factor of apportionment, as the heavier freight train. That seems to be fair, as the lighter passenger train requires certain forms of

construction and maintenance of track not used by slow moving

freight trains.

The super-elevation of the outer rail on curves is very much greater for tracks used for passenger service than for those used for freight service. The elevation is increased as the train speed is increased; the track guage is somewhat widened at curves, to permit the passage of wheels around the curve without binding. This increases the wear of the rail, as the elevation necessary for passenger movement is excessive for the freight train, and causes more grinding on the inner rail by freight cars and locomotives. This being necessary for, it is chargeable to, the passenger business.

Speed is an element to be taken into account, as well as weight. The passenger train has the right of way, and freight trains must take sidetracks, with considerable necessary delay, loss in time, fuel and wages, and use of sidings, traceable to the presence of passenger

trains.

Both classes, to some extent, haul non-revenue company freight, like track material, fuel and supplies. The company car load freight, and a considerable part of its less than car load freight, is handled by freight trains; also, a very considerable amount of company freight and tools are normally handled on passenger trains, in baggage and express cars; that would be light—of relatively small tonnage. It would be more in the nature of emergency supplies and tools; it is a higher class of service, though tools and a large proportion of office supplies, stationery and smaller supplies are handled on passenger trains. The ton miles of company material handled on freight trains would be much greater than on passenger. In ton miles, the class of stuff hauled by passenger trains would. I think, be practically negligible.

The maintenance of way items are due to the use of the tracks and to weather and the elements. Some items, such as maintenance of roadbed, ties, timber, structures, etc., are assignable, in large measure or wholly, to weather conditions, while wear, renewal of rail, frogs, switches, and many structures, and repairs to track (meaning the whole track structure), are due, in large

measure, to operation.

Renewal of ties would be necessary, whether track was used or not, and rail renewal is, in some measure, dependent on the action of the elements, but in greater measure on wear; a rail not in use would depreciate as rapidly as a rail in use. In Upper Peninsula, there is very little destruction of ties due to use; it is mostly due to weather

and decay.

Expenditure in keeping banks and cuts in order is due to weather. In bridges and trestles, renewal is due to decay. There is in the latter more renewal assignable to use than in the case of ties, but, largely, renewal is due to decay. In culverts, grade crossings, fences, cattle guards and signs, the maintenance is due almost wholly to decay.

Removal of snow, maintenance of snow fences, snow sheds, etc., is due wholly to weather, as is the wooden part of telegraph and telephone lines. The maintenance of buildings, fixtures and grounds

is partly due to decay and partly to use. You cannot definitely assign as between passenger and freight, and it is due, in the main, to weather. Platforms at small country stations would be more affected by weather than by use, while at a busy freight house it is due to use more than to weather. The condition of platforms, as to safety, is required largely by passenger business.

The train mile is the ordinary unit of operation, the activities of the whole road being to move trains, whether consisting of one or of many cars, and the passage of each train, large or

small, is an exclusive use of a single line of railroad.

(Complt.'s Ex. 49, Riggs, offered in evidence.)

Complt.'s Ex. 50, Riggs, embodies modifications in Complt.'s Ex. 1, Riggs, made or indicated in direct and cross examination. This indicates a net reduction of reproduction cost of \$46,551, and a net addition to present value of \$16,618. The addition has not been affected by overhead percentages. Certain additions were made in land values. Deductions were made in the items, bridges, guard rail and spikes, switches, and shops, enginehouses and turntables, and the price of relayer rail in sidetrack was raised from \$20 to \$24 per ton.

There are no bridges or trestles on sidetracks, except a trestle at Waiska Bay, near Brimley, where the branch is allocated to freight. There are no station buildings or structures of any moment on branch lines. There are a few crossings and very inferior shanties. Exclusive freight buildings indicated on Complt.'s Ex. 49 are all on

main line.

Compared with main line track, the track allocated to freight, in the main, receives a small amount of money for maintenance; also compared with main line, or with passing tracks adjacent to main line used by trains in operation. The branch lines are, in the main, reasonably well kept up, and safe for such movements as occur over them. The sidetracks are maintained about as such inferior sidetracks are usually maintained, in a safe condition for the occasional passing over them of trains and cars; and, when maintenance is done upon these tracks, it generally comes in the form of a fairly complete renewal of ties and a fairly complete re-surfacing of the track, and the maintenance is then permitted to accumulate.

The sidetrack rail is suitable for the purpose, and will not need renewal for an indefinite period. There is no ballast on these tracks, except sand, cinders or, occasionally, gravel of poor quality. I have considered ballast on sidetracks as earth surfacing, at the price per yard for grading. The tie renewals are much less frequent on such sidetracks than on main line—not that the life is longer, but the movement over them is not so frequent; they are slow switching movements, and they are not required to be kept in as safe condition as main line and passing track ties. The renewal of ties and re-surfacing comprises the principal part of maintenance of exclusive freight tracks.

Riggs.

Recross-examination.

By Mr. Wykes:

I cannot give you the value of the 173.01 miles of track (corrected to 157.27 miles) assigned to freight, as it must be picked out of the various schedules; it is capable of separation. In property devoted exclusively to freight, I have not included Bessemer or Republic branches, where I think there is no passenger service at present; that has been true as to Bessemer branch for a longer period than 18 months, though on Republic branch passengers are carried on certain trains.

These are included as main line, as both are operated by regular freight trains. I am inclined to think that both should be classified as lines used for freight, and that, in making complete allocation, it might be more fair to include them with the freight tracks than with the joint property. It would be absolutely necessary to so treat the Bessemer branch. Bessemer branch does not carry passengers; Republic branch does. There are no purely passengers.

140 senger trains on Republic branch; the passenger business done there is either on freight or mixed trains.

The revenue train mileage is entirely computed on the main line tracks which are assigned to joint freight and passenger; none of the mileage entering into revenue train mileage basis would be made on the 173.01 (corrected to 157.27) miles assigned to freight.

Q. But the expenses, assuming a division of the expenses upon the revenue train mileage basis, the expenses arising upon this 173.01 (157.27) miles would be divided between the two departments upon the basis of revenue train miles made on other parts of the line?
A. I don't know that I have the question. I do not understand

A. I don't know that I have the question. I do not understand that I have testified as to a division of operating expenses; I understand the question to be aimed at operating expenses.

Q. Yes, if you have not, I n sunderstood both Mr. Butler's questions and your answers. If you are willing to limit the replies that you have already made so that it will not include operating expenses, I will withdraw this question.

Mr. Butler: I think the question related to the operating expenses, the maintenance of way over which the mileage was made. I did not speak of my memory, but I intended to simply take the opinion of the witness as to the propriety of that factor for the division of the maintenance of the common property over which the passenger and freig. t train miles used as the factor were made.

A. I don't know that I could testify fully as to the matter of operating expenses. For example, the delivery of a freight train, a train load of ore from Ishpeming or Negaunee to Marquette would certainly include the expense of placing that train either

upon one of the sidetracks in the storage yard or, possibly in some instances, upon the docks themselves, and, in going into operating expenses, you have the extremely difficult matter of

undertaking to make separation as to just where the switching movement leaves off and where the expense of the road movement begins. A number of elements come into a computation or distribution of operating expenses that I do not feel qualified to testify upon at all, as I have not gone into the question of either earnings or operating expenses in this case.

Q. Do I understand you, then, to testify that the train revenue

mileage basis is proper for the distribution of the expenses?

A. I testified that in my judgment the revenue train mileage basis was a proper basis for the apportionment of values as I have attempted to do in Ex. 49. I do not remember having testified with regard to that basis, or any other basis, in the manner of apportionment of expenses.

Q. If you addressed yourself to a division of the property, and not to a division of the expenses, in your testimony, why was it necessary, this morning, for you to weigh the considerations which made up for the relative expense in the freight and the passenger depart-

ments, as you did at some length?

A. My testimony this morning was directed wholly at the one item—maintenance of roadway—and it seems to me that what I said this morning regarding the effect of the passenger train movement and the freight train movement over the road, as it relates to that one item, was proper, as showing why, in my judgment, equal weight should be given to the freight and passenger train mile.

Q. And that testimony was based upon the propriety of the use of the revenue train mileage basis for the division of expenses, was

it not?

A. Primarily as showing that the passenger train mile and the freight train mile were proper for a division of property and, I think for that particular item, for division of expense.

The question of a division of the property between passenger and freight came up early in my work. I got the idea of the revenue train mile basis after consideration of several basis; in my judgment, that was the most proper. The revenue train mile is a unit often used in railway accounts and statistics. Independent of where it may have been used for division of the common property, it seems

to me it is a fair and proper unit.

I would say that I got that basis on a result of a series of conferences with my associates and with Mr. Delf, and others, and I decided to use it because, in my judgment, it has appealed to me as the proper basis. I know of no instance where it has been used in the allocation of property. I don't know that it is the fact that this particular basis assigned to the passenger a larger amount of property than any other basis that can be selected; I am unable to answer you as to that, in full. It does throw into the passenger department more than some of the other bases—I think more than the revenue basis.

Q. Now, I have understood you to say that in the distribution of the items of maintenance of way and structures between the passenger and freight departments the use of the revenue train mileage basis is approved by you, or do you say now that you don't care to testify on that?

A. I did not, I think, in my testimony undertake to say that that or any other basis was most proper for a distribution of operating expenses, and I merely referred to those items of mainte-

143 nance of way which were affected by freight movements and passenger movements as being an argument to support the contention that the freight train mile and the passenger train mile

were entitled to equal weight in the division of property.

It is difficult to fix a definite percentage of repairs and renewals of ties due to train movements or to weather. That has been attempted by engineers, but the opinion of engineers differs, and percentages vary. It also varies on each of the different items entering into maintenance of way. On ties, the greater part of the expense is due to weather and decay, but to say whether that is 70%, 80% or 85% would be difficult, and a matter of opinion. Engineers have undertaken to make such an estimate; I think they ranged between the percentages that I have used—70% to 90%, weather. On rails, the larger percentage of depreciation is due to wear. Any work which has to be done on the grading, cuts or fills, due to settlement and washing of the slope, is chargeable almost whelly to weather.

The surfacing, once done, is by no means finished; it is a continuous operation, and a large part of the charge of repairs to roadway and track is the continual re-surfacing and maintenance of line and track to grade. That is due, in the main, to operation. A re-surfacing of the entire road is necessary every year, and the section men are continually at work, re-surfacing. The expense of maintenance of way and structures is due to two considerations, one of which is

train movement.

Q. Now, if the train movement were equal in weight,—that is, if the movement of the unit in each instance were of equal wear on the track, and equally expensive,—it would be unquestionably proper to divide that part of the expense that is due to train movement on

that basis, would it not?

A. Yes, if you could conceive exact equality—

Q. If it were equal, but we have the situation of dividing the expense of maintenance which — due to train movement upon a revenue train mile in the passenger department as against a revenue train mile in the freight department, if we use the train mileage basis; that is true, isn't it?

A. Yes.

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Q. And those two things do not represent the same thing, do they?

A. They do not represent the same thing exactly, in that you may have a train movement in your freight department varying all the way from a locomotive with a caboose up to a locomotive with a long and very heavy freight train, several times heavier than the weight of your passenger train; but, in each case, you have with that train mile unit the locomotive; the wear upon your track and track structures crossed by your locomotive is much heavier than the wear caused by the passing over of any number of wheels of your freight cars or your passenger cars.

The Master: Isn't the wear by a freight locomotive much greater

than by a passenger locomotive?

A. Not necessarily. That will depend upon the character of locomotives in the service upon the road. Where your passenger locomotive approximates or equals your freight locomotive in weight, as many of them do, your wear from your passenger locomotive is heavier and your passenger locomotive is running at a much higher rate of speed than your freight locomotive.

The Master: Does it make much difference with the wear, whether

the locomotive is drawing a very heavy train or not?

A. It is a very difficult matter to analyze the wear upon your tracks. A freight train on a grade, drawing a very heavy train and moving slowly, will cause more damage to your track in going around a curve than a passenger train followed by a light load moving at a high rate of speed, and that, in a measure, is chargeable to the fact that your curves must be elevated for your high speed passenger trains beyond the elevation that is required for your slow moving freight locomotive, that is drawing its maximum tonnage.

Q. Now, I think, Mr. Riggs, that we are agreed to this point, that the passenger train mile is not the absolute equal in cost of the freight train mile, in cost of maintenance of way. That is, the variation of cost may be on one side or on the other—we are not saying which, now—but the cost of a passenger mile, to maintain that right of way, is not the same as a freight mile; we are agreed to that point?

A. I think I will say that the two are not exactly equivalent, any more than with all freight train miles, that freight train miles made by one train are the exact equivalent of the freight train miles made by another freight train. It is very difficult to tell just what weight should be given to the freight train mile in the matter of expense,—for example, on a single track road,—for the reason that some of the expense of the freight train that is, in the ordinary course of accounting, charged to the cost of a freight movement, is directly tracea'de to the fact that the road is a passenger road and the expense is made necessary by passenger movements over the road.

The Master: Could you say that one is greater than the other, and,

if so, which?

A. Well, as far as the effect upon the maintenance is concerned, I don't know that I would undertake to say that one was greater than the other; either might be greater or might be less.

The Master: But the difference—could you give any idea between

what points the difference would vary?

146 A. That would be a very difficult thing to do; your honor.

The Master: Would they vary very much?

A. The freight train mile of the freight train is generally heavy and longer train than a passenger.

The Master: Would they vary 10%?

A. They might vary much more than that.

The Master: I mean between freight and passenger; not between different freight trains?

A. Yes, I would say there might be a greater difference than that.

The Master: But you couldn't tell which would be the greater?

A. No; I am inclined to think that in the effect upon the water of the road, upon a single track line, the train mile should be given about equal weight; that is my judgment.

Q. That is the only judgment that will permit the use of them for the division of common expenses, is it not—that they should be given

equal weight?

A. Yes.

Q. If they shouldn't be given equal weight, then you must abandon them as the purpose of the division of common expenses?

A. Yes.

The Master: Would you have to abandon them if you could determine the ratio; why couldn't you take the ratio, and make it the purpose?

A. If it were possible to determine the ratio, it might be taken as a

basis.

Q. But they are two different things, are they not; one is a freight, we will say, of 22 cars, and a locomotive and a caboose, and the other is a train made up of three and three-quarters cars and a locomotive, and you are saying, in the use of your revenue train mileage basis, that one of those, in the wear of the track, is the equivalent of the other, and, yet, they are two different things?

A. I do not know; I do not think that I have in mind, now, figures

as to the average train.

Q. I have given you about the ratio; it may be four instead of three

and three-quarters, for the passenger?

A. In the one case you have a train that is made up of a larger number of cars, some of which are loaded, some of which are empty, and some of which are light, with a light caboose, moving at slow speed; in the other case you have a train varying from three to six or seven cars, with a locomotive substantially equivalent in weight to the freight, with cars that are longer and heavier, with a very much higher rate of speed.

The Master: Could you give any idea what part of the wear of those two trains comes from the locomotive, and what from the cars?

A. Well, I haven't gone into that, your honor, at all. The greater part of the wear of the train is due to the locomotive. As I said this morning, I haven't gone into the question of the weights of locomotives used in the various classes of service on D. S. S. & A. Some of the heaviest locomotives they have—some of the heavier and more modern locomotives—are used in passenger service, and some of their older and lighter locomotives are used in freight.

The Master: Assuming they are the same weight, can you form any idea as to whether this freight train, of 22 cars, would cause any

greater wear on the track than a train of four passenger cars?

A. The high speed passenger train would cause more wear, or would be apt to cause more displacement.

The Master: I mean now the cars, supposing the engines are the same weight?

A. I don't know that I can answer that, your honor.

The Master: What I was getting at was this: If the locomotives

are the same weight, and have the same effect upon the track, would there be any considerable difference between the two trains with re-

gard to the cars?

A. I don't think there would be any appreciable difference, and I think that the rate of speed in one case would tend to offset the greater number of blows given to the track by reason of larger number of wheels in the other train.

Q. When you say there wouldn't be any appreciable difference, you mean to weigh on each side all of the elements that make for

wear of the track?

A. Yes.

Q. Against all of the elements that make for the wear of the track on the other side.

A. Yes. Q. You wish to say that, taking into account the weight, the speed, the starting and stopping, and all of those things, the train mile in one department is about the equal of the other? But you don't mean to answer, that there is no more wear from the 22 freight cars than there would be from three or four passengers cars, excluding all other elements?

A. I think, taking that question as a whole, I would answer the

first part of it, yes, and the second part. no.

Q. Now, there are conditions and things attendant upon the movement of a passenger train which make that movement more 149 expensive than the movement of a freight train, even though the freight train has more cars, are there not?

Q. The speed that you mention is just one example on that side. There are on the other side things which make the movement of the freight train more expensive on that side of the proposition?

A. You have reference, now, to the effect upon the track, or cost

of operation of the train itself?

Q. I have reference to the entire wear due to the train movement, the thing that you have testified, maintenance of way?

A. Yes.

Q. Now, there is no way, is there, that we can with certainty determine what proportion of the cost is due to the speed in the passenger department—how much that increases the maintenance of way ex-

pense attributable to that department?

- A. I do not believe that it would be possible to give exact value in this case to the speed, or to the weight in the freight department, or to the pounding of an extra number of wheels in the freight department, without a very careful study of local operating conditions over a period of time; I would not undertake to fix any value to those elements without access to a very large amount of information not obtainable, and I do not know that, even having it, I would undertake to do so,
 - Q. Do you know of anyone who has ever undertaken that?

A. No.

Q. Isn't it true that, in the investigations you are familiar with, the

expert has rested his conclusion upon those things in his judgment, and not in the fixing of percentages?

150 A. Yes, I think that is, in the main true, largely for the reason that exact information is difficult of ascertainment, if not impossible to secure.

Q. Have you ever made any investigation of the life of rails upon a road devoted exclusively to freight business, or almost exclusively to freight business, as against one having a large passenger traffic?

A. I have given a good deal of attention, the last few years, to the subject of the life of rail. I have gone far enough into the subject to know that there is very little data available to the engineer in general practice, as I have been, and that there is a vast difference in the life of rail on different roads, as between straight track and curved track, as between the inside and outside rail on the curve, and as between rail on level track and on grade. There has been an immense amount of investigation reported to the different railroads that, if it were analyzed, if it had been analyzed by the different engineers familiar with each local condition, and tabulated, would unquestionably be of great value; but such analysis, in most cases, has not been made.

The Master: Any of it on roads used exclusively for freight?

A. In some work that I did a year ago, on the Buffalo, Rochester & Pittsburg Railroad, a road which was used exclusively for freight, and a road having a tremendous tonnage per mile of road, I got some figures that were fairly definite; but that case is not at all comparable with D. S. S. & A., for the reason that the Buffalo, Rochester & Pittsburg has a great many times—25 or 30 times the tonnage, per mile of road, that South Shore has.

Q. The rails have a very short life on that road?

A. The rails have relatively a short life on that road; I haven't enough data that would enable me to fix the life on rails based upon the tonnage over them, but the use of the road by trains—the tonnage over the rail—is unquestionably a large factor in the life of rails; whether the rail is on the main line, with heavy or light traffic, on branch line or side track, would so affect the life of the rail, and wear of the rail, that it is very difficult indeed to fix any average figure that would be fair to apply.

Q. Then, weight and the number of wheels is just as important a

consideration as speed?

A. Well, all of the conditions, weight, the number of wheels, speed, the number of curves, and whether the track is on level or on light or heavy grade, all enter into and affect the life of rail. For example, there is one curve on the Buffalo, Rochester & Pittsburg where the life of the rail is less than a year, while there is other track in the main line, nearby, where the life of the rail is 10 or 12 years.

Riggs, recalled.

Further recross-examination.

By Mr. Wykes:

Riggs' apportionment of mileage of track in Michigan between freight, passenger and common, as corrected, is as follows:

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Character of track assigned.	Exclusive passenger.		Common.	Total.
track assigned.	passenger.	freight.	Common.	Total.
Main Line:				
Owned		*****	420.18	420.18
Joint			. 00)	. (70)
Branch Line:				
Owned		52.85		52.85
Joint		2.02		2.02
Second Track:				
Owned			5.08	5.08
Joint			.74	.74
Sidetrack:				
Owned	77	87.49	30.79	119.05
Joint	85	13.65	.71	15.21
Terminal:				
Joint		1.26	.26	1.52
Total	. 1.62	157.27	458.59	617.48
Joint tracks, operated over, but not	assigned to	D. S. S. &	Α	21.53
Total Michigan trackage ope	rated over			639.01

I have used revenue train mile basis for apportionment of common property and tracks used by freight and passenger, as given in Complt.'s Ex. 49, Riggs. I do not think it possible to use any basis for this division which would not be open to argument, opposition or criticism. I believe the revenue train mileage basis represents most closely the use of property.

Revenue train mile basis is computed on main line movements, as no part of revenue train mileage is made on tracks definitely allocated to freight or passenger. The question of time "quired for a passenger and a freight train mile is an element, but not very strong. I believe the freight train mile is substantially equal to

the passenger train mile. It would make no difference that freight train mile uses property twice as long as passenger, assuming both to be operating on a clear track. A slow moving train interferes with more trains than a fast one, while more track must be kept clear for the latter.

The reason that I make train movement the unit is that it is an exclusive use of the track. I cannot see that time is the determining

criterion, because part of the time the track is not in use. The unit of use is the train mile. If you assigned 12 hours a day for freight service alone, one-half of the property would be assigned to each. In such a case, time would be of more influence than as the schedules actually exist.

If it were possible to ascertain the actual time the property was used by each class of service, time would enter into the division more, but other elements, such as increased cost, delays, etc., must be considered. These other elements are also questions of time, however. It is not necessary that you know the speed of different classes of trains in order to say that a passenger train mile is equal to a freight train mile.

In the division of expenses of maintenance, considering the unit of division to be the train mile, to say that a passenger train mile equals a freight train mile, we must know the relative speed and weight of trains, number of car wheels and cars, and weights of locomotives. All should be studied before you can answer that the revenue train mile basis is proper for a particular road. The same elements that make certain classes of wear in freight service are also present in passenger, but some elements present in passenger service are not present in freight service, and vice versa.

You are weighing different elements against different elements, to some extent, but not entirely, for the greater part of the 154 stresses upon the tracks are due to locomotives and the first pair of drivers. For this reason, locomotive mileage is a very fair one. The locomotive mileage, generally, is about the same

as train mileage.

Switching miles should be the same equivalent to the distribution of these amounts as miles that are not switching miles. Part of the cost of maintenance is due to wear and part to decay. The reason all should be divided between the two departments on the basis of train movements is that all the roadway, if not actually engaged in transportation, is incidental to the track. For that reason, whatever is the best basis for dividing track expenses should be used for other maintenance of way expenses. Any basis correct for the major items should be applied to minor ones.

As long as a road is maintained, and necessary, renewals of ballast are made, to keep the road in the most efficient condition. It cannot be said that ballast depreciates, but, if it is allowed to become mixed with dirt and is not renewed, you might say that it has depreciated. The replacement is not a betterment, except where the

amount under the ties is increased.

I valued the car shop at Marquette at \$20,736 (\$1 per square foot), which includes everything—piping, lighting plant, etc. It was finished a short time before my appraisal. I examined the additions and betterments account, but applied a flat price of \$1 per square foot to it, as well as to the stone shop building at Marquette, the rail sawmill, building, etc. I used that price on a large shop building of brick and stone, and on many smaller buildings, though the reason was different.

That \$1 unit was per square foot. In the 1900 appraisal, we used

a cubic foot unit. I used the square foot, because it is much easier to ascertain. The square foot basis is fair on the great bulk of railway buildings, as they are generally of uniform height

and construction. The total book cost of that shop was about \$16,000, but book charges do not include salaries of engineers,

transportation of materials and other items which it is impossible to charge to particular work. That is true of any shop structure, but not so true of a depot or other building not used by employees

of the company of the class that use this shop.

I did not examine the accounts with reference to specific buildings, but made general inquiries. It would be fair to say that in many cases transportation of material is not charged. Even in such items were charged here, I should not change my estimate, unless the total cost of the building was analyzed. In some cases, the cost

of buildings which are identically alike vary.

There are about 150 (157.27) miles of track on which there is no passenger operation, and on which there is no train mileage which enters into the revenue freight train mileage. By the application of the revenue train mileage basis of division of the expense of maintenance of this 150 (157.27) miles, we assign the expenses of its maintenance on a train movement that doesn't occur at all. To make the division correct, it would be necessary to allocate the expenses of maintenance of that 150 (157.27) miles. The proportion of expense would be small. My percentage of condition is as high on these spurs, sidings, etc., as on main tracks, but the standards are different. The sidings and spurs assigned to joint use are kept in better condition than those assigned to freight only, except those freight lines to mines over which locomotives run often.

There are about two miles of track assigned exclusively to passenger use, consisting of Marquette depot tracks, etc. There are a few buildings devoted to passenger use only, but they have small relative value. The exclusive freight tracks are feeders for the business of the main line. There are no passenger tracks

which compare with these freight tracks, other than the two miles

mentioned, and even the latter are not really comparable.

RIGGS.

155

Redirect examination.

By Mr. Butler:

The mileage statement and apportionment given, I believe to be

correct, although I may be mistaken on minor tracks.

When I used the term "surfacing," I referred to the original work that is done to put the track in shape for operation. Re-surfacing is never a capital charge. Section men generally do re-surfacing, by fixing the joints and tamping the tracks.

The amount of maintenance due to use or to weather varies with the character of the structure, drainage, topography, soil and climate. Weather stress is much less upon concrete, iron or steel than upon wooden structures. The more permanent the material, and the higher the class of structure, the less the depreciation by weather, Renewal of rails is due almost entirely to use, though weather is a heavy item in breaking of rails. The character of track maintenance, ballast, continuous joints, and other equipment, is due in considerable extent to passenger service, and they would be of a lower grade on South Shore for freight service only.

The outer rail on curves on level tracks wears out much quicker than the inner rail, though, on sharp curves, the head of the inner rail grinds off. The life of a rail is also shorter on a grade than on

the level. With the limited knowledge of the subject so far obtained, it is impossible to state any fixed formula for estimating the relative wear under different conditions, but it is well known that the wear is greater on curves and grades. The superclevation of outer rail on South Shore is in no case extreme, the maximum being about three inches, while the degree of curvature is three or four and sometimes five. Such track is suitable for a speed of 45 to 50 miles an hour.

Freight trains do not usually go that fast around curves, and the tendency is therefore to wear off the head of the inner rail. It is practically impossible to adjust super-elevation to suit all traffic, but such elevation is necessary for safety from overturning at the curve at high speed. There is a tendency for the flange to climb the rail, and for the train to topple over. Rails do not break from the strain as often as do flanges, on account of the outer rail not being elevated enough. If heavily loaded cars go around a three degrees curve which has a five inch super-elevation, at only 10 miles an hour, the flanges grind the inner rail, which has a tendency to tip over.

The revenue train mile, both freight and passenger, was performed wholly upon the tracks which were assigned to both freight and passenger business. The engine mileage performed on the exclusive freight tracks is called a switching mileage. As a rule, a train occupies, to the exclusion of all others, the space between two nearest stations. Passenger trains generally have precedence, and freights must often sidetrack while a passenger train goes by two or three stations.

Tractive power of locomotives depends on weight, size of cylinders, and size of drivers. Other things being equal, tractive power increases with the size of cylinders, stroke, boilers and drivers.

158 If one passenger train and one freight train each way, every day, go over a stretch of track protected by cattle fence, the expense of the fence would, on the revenue train mile basis, be equally divided between passenger and freight. If the freight train carned nothing and the passenger train earned \$10, and the expense were divided on the revenue basis, passenger would have to pay the entire cost of the fence, though freight would have equal protection.

On November 16, 1912.

Riggs, recalled.

Further direct examination.

By Mr. Butler:

In fixing unit price on country lands, I have not attempted to fix values on individual pieces, but average prices which are in my opinion fair and conservative, taking into account:

(a) The fact that the consideration paid for a narrow strip of land always exceeds, by from 2.5 to 6 times, the acre price of ordinary

sales in tracts of such size as are sold in usual business.

(b) That cost covers the value of the land taken and severance damages to the remainder of the tract.

(c) That the land is available and demanded for railroad use. (d) That the cost to railroad company, in addition to consideration paid owner, covers abstracts, expenses and salary of right of way agent, entry fees, recording deeds and contracts, expense of attorneys, courts and juries in condemnation.

159 Riggs.

Redirect examination.

By Mr. Butler:

Assuming maintenance of railroad, its roadbed appreciates greatly by lapse of time, and that was taken into account by me in saying that cost of reproduction new was to be the value.

On February 25, 1913.

Riggs, recalled.

Cross-examination

By Mr. Wykes:

I may have said in testimony that the cost of maintenance of ore spurs and branches would be, per mile, substantially as much as main line and main line branches, by reason of the rougher usage to which the tracks were put and the heavier movement over them. I don't believe it possible to make any definite separation of the cost of maintenance of these tracks from any company records.

On sidetrack and spur construction, I took into account maintenance condition in fixing my percentage of present condition. On them, I used a lower percentage than on main line. The Bessemer and Republic branches and south line, Eagle Mills to Winthrop Jet., were treated as main line. As to proportion of cost of maintaining main line, what it would cost to maintain industrial tracks would de-

rend on the service and the number of movements.

I think, in general, it is fair to say that on any secondary track the maintenance per mile is less than main line track. The practice of many railroads is to consider 2 or 2.5 miles of secondary track or siding equivalent to a mile of main line, in arriving at an average figure per mile on maintenance, and some of these tracks will un-

questionably have very little money spent upon them annually
for maintenance, while others will have a very considerable
amount. I would expect to find much more money spent per
mile upon such a line as Palmer branch than on Deranson lumber

spur, or other lumber spurs on west end.

On such lines as Palmer branch, there are a large number of movements, and they are in the sense of mine movements over them. There is considerable operation on those tracks, and there might be more frequent movement and more tonnage over them than on some parts of the main line; e. g., parts of the line west of Nestoria; I don't think that would apply to the whole line. Other parts of the line having nothing over them but regular trains, while the mine spurs have a large movement of ore from the mines to the main line.

In Complt.'s Ex. 49, Riggs, I allocated south line, Eagle Mills to Winthrop Jct., as common main line. There is on a portion of that track (south line, Eagle Mills to Negaunee) a very considerable part of main line freight train movements. It is operated, really, as a part of second track; for that reason, I classified it as main line. The passenger station at Ishpeming is on north line, a mile or more away from south line, so that all of the passenger train main line move-

ments are, I think, over the north line.

I have treated the south line, Negaunee to Winthrop Jct., as main line, common between passenger and freight. I think the same is true from Eagle Mills to Negaunee. I think it might be proper to exclude from common track such portion as is not used in regular main line movement; I think it would be proper on that portion of it that is treated as main line and used by main line freight trains, thereby relieving the north line and saving the necessity of second track, the same as the rest, even though there were no passenger movements over it; that is because it relieves the other track.

These eight miles of line would necessarily be assigned to the freight business if you strictly exclude everything that is not operated on by passenger trains. My theory of treating it as common is that it is, in effect, a double track and relieves the main line, leaving it free to passenger traffic to a greater extent than if

these freight trains ran over it.

The north line is single track from Marquette to Eagle Mills and double track from Eagle Mills to Negaunee. There are three lines of rails from Eagle Mills to Negaunee. All passenger movements, both east and west bound, are over the north track, and pass the passenger station at Ishpeming.

The 8.7 miles, Humboldt to Republic, I treated as common main line; also the 2.23 miles, Bessemer Jct. to Bessemer. If there is no passenger traffic on that, it would, under a strict allocation, come out.

Between Winthrop Jct. and Marquette is practically the only double track line on South Shore; in part, there are three track there. This is made necessary by the large amount of train movements due to the ore business and operation of C. & N. W. and C. M. & St. P. trains over the track; all those conditions unite to make that a very congested district.

Riggs.

Redirect examination.

By Mr. Butler:

With minor exceptions, the main line tracks are used for both freight and passenger trains. Refinements in construction and adjustment made necessary for faster moving passenger trains increase the maintenance charge over what it would be if the tracks were used by freight trains alone; that extra sum is undoubtedly substantial. The spurs and sidings not used for passenger trains

are not subject to refinement necessary to keep the tracks in safe condition for passenger trains, nor are they subject to the extra cost made necessary thereby. Other things being equal, except the use, the maintenance of such spurs and sidings would

necessarily be less.

The sidetracks were estimated on the basis of relaying rail. That is not true of tracks not included in Schedule 16, Sidetracks. It was assumed that relaying rail could be used indefinitely in these tracks, and would not need renewal; theoretically and practically, there is, therefore, no rail renewal. Ties are not so numerous, being 3,000 to the mile on main line and 2,640 on sidetracks. The ties in spurs to lumber yards and sidings would not require as frequent renewal as in main line, and they are cheaper—culls; they could be used until they practically rotted away. On these spurs and sidings, there is no ballast, except sand or earth surfacing; so the item of ballast maintenance would be eliminated. What is true of rails, ties and ballast would be true of the item "other track material."

There are practically no bridges, trestles or culverts, and only a small amount of minor drainage, on these spurs, branches or side-tracks; so the expense of their maintenance would be practically eliminated. By far, the greater portion of maintenance of bridges, trestles and culverts would be exclusively on main line. On these branches, sidings and spurs, there are some grade crossings, but no fences or cattle guards. What grade crossings there are would not be kept in as good condition as on main line, except in some of the

cities-Ishpeming and Negaunee.

There are no snow fences to any extent, and no signal or interlocking plants, or telegraph or telephone lines, and no buildings. The expenditures for roadway tools and supplies would be in about the same relation as work and material put on the spurs, branches and

sidings.

The principal items in maintenance of main line are ties, rails, ballast, bridges, trestles and culverts, buildings, fixtures

and grounds, other track material, and repairs to roadway and track.

The expenditure on the branch lines, sidings and spurs, for roadway and track, would be much less per unit of distance than on the main line.

Usually, in computing mileage for a determination of maintenance cost per mile, 2 or 2.5 miles of branch and secondary line or sidetrack is considered as one mile of main line. That would be all sidetrack mileage of the road; it would be a much greater proportion for a spur to a lumber yard, because the amount of money spent on a mile of main line passing track would be much more than spent on one of these lumber of spurs. The maintenance of a main line passing track would probably be, per unit of distance, six times more than the maintenance of a spur going out to an industry. I think it would be impossible to get exact figures for the cost of maintenance of exclusive freight tracks, unless that information were specially desired and separated.

Riggs.

Recross-examination.

By Mr. Wykes:

Of under and overhead crossings, there are two or three at Mar-

quette; they are for carrying over the freight tracks.

When I said it might cost six times more to maintain a passing track than a sidetrack to an industry, I did not mean to include in the sidings the important mine spurs, as I should classify some of them as fairly important tracks, with frequent movement and more maintenance. Some of South Shore spurs have such traffic over them that there must be considerable maintenance in order to keep them

164 • I cannot say that South Shore is ballasted beyond the point of good practice, or even up to good practice, but there is more ballast on the road than if nothing but freight movements were made over it. The ballast has the tendency to lengthen the life of the ties. I do not think that the expenditure of \$2,507 for ballasting on South Shore in Michigan in 1910 was more than would have been put there had the road been engaged only in freight service.

On November 28, 1913.

Riogs, recalled.

Further direct examination.

By Mr. Butler:

Complt.'s Ex. 1a, Riggs, is Riggs' second appraisal of D. S. S. & A. It is a revision of Complt.'s Ex. 1, Riggs, and excludes property not in existence June 30, 1913, and includes additions and betterments to June 30, 1913. The property is allocated to exclusive passenger,

exclusive ore, exclusive freight (other than ore), common freight and passenger, and common ore. The summary includes ore and freight under caption "Freights." The arrangement, in general, is

the same as Complt.'s Ex. 1, Riggs.

Complt.'s Ex. 1a covers the entire ground of Ex. 1; where the structures remain unchanged, totals only are carried into Ex. 1a. Where a structure remains unchanged, Complt.'s Ex. 1 must be referred to for the details. Complt.'s Ex. 1a relates only to Michigan property. No lands or overhead charges on lands are included in Ex. 1a. The figures in the summary, sheet 1, are based on Ex. 1, modified by examination of the property made this year, and relate

to June 30, 1913.

While, in one or two schedules, there have been some changes of unit prices, in the great majority of schedules they remain the same. Corrections have been made in some of the schedules. The inventory is based upon two inspections made this summer (1913), partly by me and partly under my direction, whereas, for some of the schedules in Ex. 1, I depend on company records. In this case, we have made an inspection and inventory in the field. The purpose, among others, was to get the deductions and additions between June 30, 1911, and June 30, 1913, and to note errors of omissions or inclusions of first appraisal.

The schedule of culverts and minor waterways in Complt.'s Ex. 1 was based on office notes of the superintendent of bridges, without detailed inspection. Mr. Hansel used my figures for culverts.

Our inspection was made to bring schedules to date, and to give an inventory of minor waterways. Messrs. Baily and Cadarette, who assisted in the inspection, reported to me the result of the field work; I was in constant touch with them while on the inspection. All matters coming up during checking of schedules were referred to Mr. Cadarette, and quite a large number of structures other than bridges were measured and checked by him.

The totals on summary sheet, page 1, cost of reproduction, \$17,-584,369, and present physical value, \$14,602,343, include no real estate or overhead charges thereon. In my opinion, the summary statement is a fair statement of what it purports to be; also the allo-

cation between the different classes of business.

In Complt.'s Ex. 1a are corrected certain errors of Complt.'s Ex. 1; e. g., water and fuel stations at Soo were included in entirety, while there should have been included only one-half interest; three or four structures which existed in 1911 were

omitted. The total amount involved is not large; these additions and deductions are not specifically described as being corrections to Ex. 1.

To ascertain the value of the property as of June 30, 1913, there

is no occasion to refer to Ex. 1, except for details.

Page 2 of Complt.'s Ex. 1a is a summary comparing Complt.'s Ex. 1, Defts.' Ex. 15, Hansel, and Complt.'s Ex. 1a. In comparing, I did not correct percentage items of Hansel or 1911 appraisal, by excluding percentages on land. On sheet 2, the 1911 appraisal is as corrected by Complt.'s Ex. 50, Riggs.

Pages 3, 4 and 5 of Complt.'s Ex. 1a, Riggs, relate to mileage. The differences between the mileage as of June 30, 1911, and June 30, 1913, is analyzed, showing:

Soo to Marquette, increase, branch lines	.05 .42 .22	miles miles miles miles
Nestoria to state line, increase, oranch line		miles

This increase bas been built since the 1911 inventory.

Pages 6 to 9 of Complt.'s Ex. 1a shows grading, clearing and grubbing; this is divided to freight, passenger, common freight and passenger, and iron ore; the iron ore and freight are separate, but have been added to carry into the summary on page 1.

Throughout the schedules in Complt.'s Ex. 1a, the word "freight" excludes ore: the term "ore" includes that handled in ore trains to

Marquette from the mines, and takes no account of property used for ore carried in freight trains to other points than Marquette docks. "Exclusive Freight" includes ore moved over other parts of the line than from mines to Marquette. The ore property, as I have segregated it, as exclusively used for the ore business, all lies at Marquette or between Marquette and Beaufort Jet., on the main line.

I have made comparison of schedule 3, Grading, Clearing and Grubbing, between Complt.'s Exhibits 1 and 1a and Defts.' Ex. 15, Hansel. For this schedule, I used the same unit prices and quantities in 1911 and 1913, with increase in 1913 due to addition of 15.41 miles of branch line. The increases are:

Grading, 15.41 miles new branch line	123,280	yards
Grading, filling trestles	131,500	yards
Clearing and Grubbing, 15.41 miles branches	92	acres
Increase, C. O. R., due to above Increase, C. O. R. net (\$3,500 deducted due to elimi-	\$53,794	
nation of retaining walls)	\$80,259	

The difference between Complt.'s Ex. 1 and Defts.' Ex. 15 is accounted for almost entirely by difference in unit price for earth,

The comparison of unit prices and quantities is as follows:

168

Earthwork.

Unit Prices.

Description.	Riggs, 1911.	Riggs, 1913.	Hansel, 1912.
			\$.20
Earth	\$.30	\$.30	.26
			.40
Loose rock	.50	.50	.50
Solld rock	1.35	1.35	1.35
Shrinkage	.30	.30	.25
Clearing	40,00	40.00	40.00
Grubbing	109,00	100.00	100.00
Masonry	10.50	10.50	8.00\$
Dry Stone	9.00	9.00	8.002
Excavation and backfill	.30	.30	.50
Excavation in cut	.30	.30	.26
Timber, per M	36.64	36.64	38.00
Piles, per foot	.40	.40	.40
Hansel Valuation		\$2,442,311	\$2,419,763
Riggs 1911 Valuation		2,879,484	2,855,596
Riggs 1913 Valuation	*******	2,959,743	2,935,985
Riggs 1913 increase over 1911		\$80,259	\$80,389
Increase accounted for:			
Grading on 15.41 miles new line, 123,280 yd	s. at 30c		\$36,984
Clearing and Grubbing, 92 acres			7,360
Filling Trestles, 131,500 cu. yds. at 30c	*******	*******	39,450
			\$83,794

Some retaining walls renewed; one cut out. Some minor grading at small culverts, to adjust amounts. No addition made on account of widening cuts and fills,

[#]For concrete.

169 Comparison of Grading Yardage as Computed by Riggs in Complt.'s Ex. 1 and Hansel in Defts.' Ex. 15.

Dist	riet.	Earth.	Loose rock.	Solid rock.	Shrink- age.	Overhaul, crossings, etc.
Riggs' e cubic ya						
Soo and St. Ign	ace to Mar-					
quette		2,247,961	31,041	15,162	208,379	156,284
Marquette to Ho	oughton	2,448,907	134,688	45,086	231,394	173,546
Nestoria to state	e line	1,666,295	18,156	9,078	154,954	116,215
Total	********	6,373,163	183,885	69,326	594,727	446,045
Total Rig	zgs' Estimate					7,667,166
Hansel's cubic ya	estimate of ards:					
Soo and St. Ign	ace to Mar-					
quette		2,413,100	26,900	24,800	138,000	73,300
Marquette to H	loughton	2,410,100	122,200	63,400	193,600	91,000
Nestoria to state	e line	1,805,900	24,900	7,600	141,100	22,000
Total	*******	6,629,100	174,000	95,800	472,700	186,300
	nsel's Estima					
Total Ha	nsel's Estima	ate				7,557,900
Total Ha	nsel's Estima	ate				186,300 7,557,900 7,667,166 7,557,900
Total Ha Riggs' total yar Hansel's total y	nsel's Estima	ate	**********			7,557,900 7,667,166
Total Ha Riggs' total yar Hansel's total y	nsel's Estima rds	ite				7,557,900 7,667,166 7,557,900 109,266
Total Ha Riggs' total yar Hansel's total y Difference Riggs in excess	nsel's Estima rds	ate				7,557,900 7,667,166 7,557,900 109,266
Total Har Riggs' total yar Hansel's total y Difference Riggs in excess	nsel's Estimards	to Hansel	's yardage:		0.01–	7,557,900 7,667,160 7,557,900 109,266 446/1000% Complt.'s Ex. 1.
Total Har Riggs' total yar Hansel's total y Difference Riggs in excess Applying Earth, 6.62	nsel's Estimards	to Hansel	's yardage:	\$1,5	0.01-	7,557,900 7,667,166 7,557,900 109,266 446/1000% Complt.'s Ex. 1.
Total Har Riggs' total yar Hansel's total y Difference Riggs in excess Applying Earth, 6.62 Loose rock, 17	nsel's Estimards	to Hansel	's yardage:	\$1.5	0.01-	7,557,900 7,667,160 7,557,900 109,260 446/1000% Complt.'s Ex. 1. \$1,911,949 91,942
Total Har Riggs' total yar Hansel's total y Difference Riggs in excess Applying Earth, 6,62 Loose rock, 17 Solid rock, 9	of Hansel Riggs' price 5,100 square 4,000 square	to Hansel' yards at yards at yards at	's yardage: \$.3050	\$1,5	0.01– 988,730 87,000 29,330	7,557,900 7,667,160 7,557,900 109,260 446/1000% Complt.'s Ex. 1. \$1,911,949 91,942 93,590
Total Har Riggs' total yar Hansel's total y Difference Riggs in excess Applying Earth, 6,62 Loose rock, 17 Solid rock, 9 Shrinkage, 47	nsel's Estimards	to Hansel yards at yards at yards at yards at	's yardage:	\$1,5 \$1	0.01-	7,557,900 7,667,166 7,557,900 109,266 446/1000% Complt.'s

In assignments of property to different classes of the service, we have assigned to common, grading, etc., and other structures on main line, passing tracks, and other tracks jointly used by freight and passenger trains or by freight trains in getting out of the way of passenger trains. We have assigned to freight, grading, etc., in all of the yards; also on all branch lines except Republic branch, which is figured as main line, used for both. To ore is assigned all branches to mines between Marquette and Beaufort Jct.

The basis is the use, and roadbed used for freight is assigned to

freight, for passenger to passenger, and for ore to ore, including the

fixed structures of the roadway.

Page 9 of Complt.'s Ex. 1a, Riggs, contains a recapitulation showing amounts allocated to different services for grading, clearing and grubbing. (Witness re-states amounts from that page, and states they are fair present C. O. R. and P. P. V.)

The following statement shows the average unit prices used by me in each of my appraisals and the unit prices used by Mr. Hansel as

to the schedule of ties:

Unit Prices.

Riggs av Hansel	verage,	1911 Va	luation	 	 *							\$.34771/2
Riggs												40
reiggs		1913 Val	luation									.40

170a Average Prices of Ties of Each Kind-5-year Period.

1000																	Cedar.	Hemlock.	Tamarack.
1909	٠.								*								46.41¢	38.47€	33.31¢
1910					•												41.91	30.14	30.47
1911												•					33.27	28.81	27.49
1912	* *																34.13	30.57	29.84
1913						*											37.95	33.33	32.02
Avera Hand	ge, lin	g	5	•		ee.	11	8	0		•						38.73¢ 5.5	33.77¢ 5.5	31.04¢ 5.5
																	44.23¢	39.27€	36.54€

I have increased the price of the ties from 34771/2 cents to 40 cents, my reason being that the price of ties at the present time and the average prices of ties for the period of the last five years all justify this increase. I am assuming the same kind of ties, and am using in this case a figure that happens to be the same as used by Hansel in 1912, which makes an increase, in round figures, of 51/4 cents per The average price referred to by me was arrived at by taking tie. the total number of cedar ties purchased by the D. S. S. & A. each year, and the total amount of money paid for them, to arrive at the average for the year of the cedar ties, and the same as to hemlock and tamarack, and using these three averages to produce the final average.

Pages 50 to 52 of Complt.'s Ex. 1a contain schedule 10, Ballast. There is an increase, in 1913 over 1911, of \$10,850, in cost of repro-The difference between 1911 and 1913 accounted for 600 yards per mile of sand ballast at 30¢ on 15.41 miles additional line. I have made no increase in value of ballast due to extensive re-ballasting west of Marquette. There, a large mileage of main line has had additional ballast put on, and it has been brought to a very much better condition; there has been quite a large addition, by reason of

widening cuts and fills, but no increase has been made except on ac-

I have estimated ballast at a maximum of nine inches under the ties, and, if there happened to be 48 inches under the ties, it has not been considered as ballast. There, clearly, is an in-

crease in value, or in the condition of the track. The track west of Marquette was fully ballasted prior to 1911, and the work done since puts on an excess amount of ballast—more than I have computed as the maximum for the standard of construction that I have used. I don't know that I should regard what has been put

on as maintenance. I don't add for that excess ballast,

We have allocated to common passenger and freight, all stations where the station building serves the purposes of both. Where there was a freight room and a passenger waiting room, ticket office and telegraph office, that building has been assigned to freight and passenger, together with the platform. At some smaller stations, such as Champion, where there is a building used exclusively for passenger service, we have assigned them to passenger, notwithstanding the fact that the Marquette building, and, to some extent, all of them, are common, in that they have a telegraph office. We have not made separation by reason of the telegraph office, nor at Marquette station on account of the offices. Some of the buildings assigned to exclusive freight also have telegraph offices used for both departments and for the public.

In buildings having a freight room, a passenger room, a ticket and a telegraph office, I have not attempted to apportion between freight and passenger. We started to study the possibility of apportioning those buildings on the basis of the number of square feet of floor space. Those figures were not turned over to me. At Marquette, there is an exclusive freight depot and a passenger station. On the second floor of the Marquette passenger station are the offices of the superintendent, car accountant and others, in which business is con-

ducted for both departments.

172 It is difficult to make an assignment of that building; it would be manifestly improper to make an allocation on the basis of square feet of use, as the building is primarily, essentially and mainly used for passenger business, and the company could not transact its passenger business at Marquette without the whole area that is devoted to this service, while it could transact its other business elsewhere. It is a two-story building, and, while it may be proper to assign some portion of its value to the common use, I hardly know how to go at it to make such assignment. I have not the data to show the pertinent facts. Nor have I for the buildings along the line generally used for all purposes of the company.

Page 130 of Complt.'s Ex. 1a, Riggs, schedule 35, Engineering on Equipment; 2% of cost of reproduction allowed, as in 1911, and allocated with equipment assigned to different classes of the service. Hansel allowed same rate, and carried it without depreciation, as I did. Hansel allowance, \$61,042; Riggs 1913, \$71,773; Riggs 1911,

\$58,924.

Pages 133-136 of Complt.'s Ex. 1a, Riggs, schedule 37, Contingen-

cies; allowed, cost of reproduction, \$1,132,048, and present physical value, \$933,917. The contingency is computed as a percentage for each schedule, and the present value is computed by the same percentage on the depreciated item. No contingencies on land are included in Complt's Ex. 1a. On page 2, contingencies on land still appear in the 1911 column, but not in the 1913 column. Hansel allowed \$479,735, for both cost of reproduction and present physical value.

Complt.'s Ex. 1a, Riggs, schedule 38, Legal Expenses. This is .5% of all items except land (1 to 37 inclusive), and is not depreciated. Allowance, 1913 (without land), \$77,637; 1911 (with land), \$85,139. No continuous allowed have a stability of the continuous allowed by the co

land), \$85,122. No contingency allowed by me on this item.
Hansel allowed \$70,000, with 10% contingency. This is
allocated the same as the property upon which it was com-

puted.

Complt.'s Ex. 1a, Riggs, schedule 39, Organization, Administration and General Expenses. 2% on items 1 to 37 inclusive. Allowed, 1913 (excluding land), \$310,551; 1911 (including land), \$340,490; Hansel allowance, \$100,000, plus 10% contingency.

Complt.'s Ex. 1a, Riggs, schedule 40, Interest during Construction. 7½% of items 1 to 39 inclusive; it is not computed on land in 1913. The 1913 amount is \$1,193,679, without depreciation. Items 38, 39 and 40 are allocated to the different classes of business by application of the percentages to the base figures which were allocated.

Complt.'s Ex. 1a, Riggs, schedule 42, Stores and Supplies. Value, 1913, \$308,502, based upon inventory. The assignment is made to each item on the inventory to freight, passenger or common. There is no attempt to allocate to ore. The Michigan proportion is 81.87%

of the total, based upon main line mileage.

Complt's Ex. 1a, Riggs, schedule 43, Working Capital. In 1913, \$154,000; Hansel, 1912, \$100,000; Riggs, 1911, \$198,000. The figure for working capital in 1911 (also 1913) was given me by Mr. Delf, and derived by him from the books. I understand it is the average monthly cash on hand, plus cash in transit from the agents and accounts collectable, being the average of twelve months.

From page 1 of Complt.'s Ex. 1a, in my opinion, the fair and reasonable present reproduction value of the South Shore property in Michigan, excluding land, was \$17,584,369, and the fair present physical value, \$14,602,343. I believe Complt.'s. Ex. 1a is fair.

reasonable and conservative, in respect to every item. I have 174 endeavored, in making it, to correct error where I have found it, up or down, as the case might be, and to make a more correct, up-to-date inventory of the various individual parcels than has been done before.

In the present physical value column, I have endeavored to put the cost of reproduction for each separate item affected by the depreciation of that item. It represents the present conditions of the various elements of property, as compared with new units. As a whole, it is not to be understood as meaning any impairment in the use value of the property.

Perhaps, in some instances of property, it might, but, as a whole,

the usefulness of the property, and its capacity to perform service, is just as good at 85% condition as it would be if all the elements were new. The property is more useful as an instrument to carry on the business of the company than if new, because the various parts are co-ordinated, working together, have been tested out, and it is a seasoned operating property, and, therefore, better than a new, untried, unbroken property. The property included in schedule 3, Grading, is in better condition as an old property than it would be if new.

I have endeavored to allocate to freight, passenger or ore, all property that could be so allocated by reason of its exclusive use in that particular branch of service. Property commonly used by freight and passenger was figured as property common between the two. That would be so as to an item of property that was used relatively a small amount in one department or in the other; it was simply included as common between the two. No attempt was made by this exhibit to make any apportionment of the common property to either class. The items allocated to freight are all in use in freight service;

the same is true as to passenger and ore.

Under engineering on roadway and structures, I have included 4% of all roadway and structures schedules. In that, I intended to cover engineering in reconnaissance and preliminary and location survey—the construction survey—that is, the engineering work necessary to take out, measure and inspect the roadbed, embankments, cuts, fills, etc.; also the engineering, inspection, plans, etc., of bridges, trestles, buildings of all classes, docks and wharves, and other permanent structures along the line in Michigan. I believe 4% is conservative, if not too low, to cover the actual expense, if the real estate is not included, on account of the large amount of work necessary in creating the railroad. I have in practice and study become familiar with the history of the extent of preliminary engineering work before the actual laying out of the work and going on to construction.

The reproduction estimate assumes the territory to be as it now is, and engineering work on such a property as D. S. & A. today is probably more favorable to low cost of engineering than in the early days when the road was built. I think if it were possible to determine original cost of engineering on D. S. S. & A., as it exists

today, that would be more than I had estimated.

As I conceive the problem of original cost, it is to secure the original cost of all structures originally or subsequently built on the line, deducting all that have been abandoned or ceased to exist. I have never undertaken to estimate original cost, and do not have in mind

the most correct method of arriving at it.

I think original cost of engineering on D. S. S. & A. would be greater by reason of the more difficult condition existing in the early days, adding to the expense of reconnaissance, preliminary and location survey and construction survey, and also due to the fact that

the road was built piecemeal, and was spread over a great deal more time, and that many of the pieces of property as they exist now were put in as small items of property on

which the engineering percentage would be unduly high-much higher than if it were possible to reproduce the property as a whole.

Notwithstanding the line is already fixed, assuming its elimination, it would be necessary to re-locate it, and to incur anew all of the expenses as if we were building another, new railroad in the territory, with the same mileage. My belief is that the final intention in 1900 was to include all engineering charges proper and necessary as part of the cost of construction of a railroad. I only know in a general way what part of the 4% engineering charge would belong to engineering for reconnaissance.

On a line I had charge of in Indiana, the reconnaissance and preliminary and location surveys, in rather open country, cost around \$100 a mile, while the total cost was \$850 a mile. The preliminary surveys would be much greater in a heavily timbered country than

in open country.

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Complt.'s Ex. 1b, Riggs, is an inventory describing right of way and station grounds of D. S. S. & A. in Michigan as of June 30, 1913, and allocating portions thereof to the different services. right of way and station grounds are in order by counties, following as nearly as practicable the list in Ex. 1. The acreages of right of way have been carefully compared and checked by Mr. Cadarette and Maps of certain cities (named) have been prepared to correspond with the allocation. The description numbers of Complt.'s Ex. 1a, Riggs, identify the descriptions on the maps.

Complt.'s Ex. 3a, Riggs, includes descriptions 1 to 14 inclusive,

Chippewa County, of Complt.'s Ex. 1b, Riggs.
Allocations on Complt.'s Exhibits 1b, Riggs, and 4a, Riggs,

are, in my opinion, correct,

I have studied conditions at Houghton, walked over the territory. Houghton to Pilgrim River, crossed by South Shore, about 2.5 miles from end of Houghton yard, secured all topographical maps made by the Government in that territory, secured copies of those locally made, and made notes on the condition. Between Chassell and Pilgrim River, there would be no serious difficulty in constructing a railroad between the foot of the hills and the South Shore, and such railroad would not be of appreciably greater expense than South Shore.

From Pilgrim River to Houghton, South Shore right of way occupies a very narrow shelf of land at the foot of the bluffs; the railroad level varies from 15 to 30 feet above water, and on the bench they occupy the original profile shows a very light grading-fills and cuts of two or three feet, with the exception of one or two streams The average grading per mile was about 7,000 yards. right of way varies in width, averaging, perhaps, 75 or 80 feet—some 66, and some 100. The foot of the bluff is very close to the right of way fence-within a few feet, all the way; in a few places, the slope is so steep that the right of way fence is 15 or 20 feet above the track. From Isle Royal stamp mill, near Pilgrim River, to end of terminal yard, the bluff is abrupt, and rises to a height of 96 or 97 feet above the lake at the school of mines.

From the center of South Shore track opposite the school of

mines building, where the track is, perhaps, 20 feet above the water, over to a point where the bluff is 100 feet high, the distance does

not exceed 150 to 200 feet.

Back of the summit, spoken of as being 100 feet high, is a second bench, which varies in height from 40 to 100 feet above the lake, being 200 or 300 feet wide; the hills back of that rise rapidly to the height of over 400 feet, and this range of hills extends for a number of miles. It would be absolutely impossible for a railroad, approaching from the south, to secure an entrance into Houghton that is favorable as to grade and amount of work as that of the D. S. S. & A. To go back of the city and come in on the line of the Copper Range would involve crossing a range of hills over 400 feet high and the construction of many miles of additional line, to secure a feasible grade.

Mr. Wykes: I wish to make an objection to the narrative as given, and to any statement of cost of locating a line on any other route, or of any other road purchasing a line through this route to parallel the South Shore, as being immaterial.

All the terminal land of the plaintiff occupied by tracks shown on Complt.'s Ex. 16a, Riggs, is on a level, approximately 20 feet above the water. There is no other piece of land east or south of the bridge across Portage Lake large enough or available or suitable for yards, except that occupied by plaintiff. I have made an approximate estimate of the cost of constructing a line from Pilgrim River into Houghton, 2.5 miles, and a further distance of 1.5 miles, to a point near Copper Range, which is the nearest suitable physical location for a yard, disregarding all questions of present occupation, ownership, values or cost of land, the line assumed being partly on land owned by plaintiff, as being the most favorable line.

It is my opinion that, ignoring all those things, without allowance for land, simply the difference in construction cost, it would be impossible to build such a line and provide equal yard

facilities for less than \$250,000 in excess of the cost of creating the South Shore property, or a similar property. It is my further opinion that such a line, because running through the business center of Houghton and cutting into high class residence property and that owned by the State, would be absolutely impossible to build. If it were necessary to actually build such a property and acquire the

land for it, the cost would run into millions.

The excess cost for the 2.5 miles and the 1.5 miles additional line for the yard would be \$250,000. The only point topographically suitable for a yard is about a mile west of the bridge, near the Copper Range yards. The excess cost is due to cost of grading, extra construction, and extra length of track, and it is based on the assumption that there would be no land to pay for. The excess arises from the fact that line must be higher than South Shore, that the earthwork would run 75,000 or 80,000 yards per mile, while South Shore runs approximately 8,000 yards, the culverts would be longer, heavier and more expensive, and there would be more rock and loose rock. I disregarded all questions of land value or cost of acquisition

of right of way, and simply make comparison of physical construction.

I have made the same study with reference to the approach to Marquette from the east. There, referring to Ex. 6a, from a point near the Standard Oil Co. dock to Chocolay River, about two miles, the road occupies a flat bench varying from 125 up to 260 feet; at one point, where the Carp River comes in, the valley widens out so there is a gap or distance between the hills of a quarter of a mile On this narrow bench, an average of 20 feet above the water, and almost level, the D. S. S. & A. occupies the land nearest and close to the water's edge; the M. M. & S. E., for the entire distance, lies

alongside the D. S. S. & A. and within a few feet of it, except at the Carp furnace, where D. S. S. & A. is on the lake side and the other road is on the land side of the furnace, for a

quarter of a mile, the roads being at least 100 feet apart.

From Marquette yard to Carp River, about a mile, there is on the hill side of the road a tier of rocks, which are quite shallow, 60 to 80 feet in depth. On these, are 14 or 15 houses, and some other structures, so the entire plat from Marquette to Chocolay River is occupied. From Carp River to Chocolay, where the hills are close, are two points where the hill comes up to the road with quite high bluffs of solid rock, and, except for these two points of rock and one or two dwellings, there is practically no occupation of the ground between the highway and the hills. The hills are very irregular along the lake front. There is no second bench; it would be absolutely impossible to locate either a hillside line or a line on any second bench, and either the flat must be occupied or a hill line located to come into Marquette at a point a couple of miles away from the present lower yard, at a much higher elevation.

I have looked at this thing in three ways: First, assuming it possible to use the highway, without providing any other location for a highway, there would be practically no added expense over the construction of the South Shore; second, if it were necessary to move and furnish a new highway, eliminating all questions of land value, it would be necessary to make two quite heavy rock cuts, one at each point of rock, and the expense would be \$25,000; third, the cost of construction of a line in the hills would be over \$300,000 in excess of the line on the flats, and would contemplate providing a yard remote from the water front, and back of the city; the cost of this yard is included in the amount given. I am speaking simply of con-

struction costs, not taking into account land values, cost of 181 right of way, or buildings; it is almost impossible to fix the excess cost of securing a suitable yard, meaning cost of construction. The lower yards are on available land, and have not in-

volved expensive construction.

The first two plans bring me to the lower yard; from that point to another suitable location for a yard would involve about 1.5 miles of additional land, and some heavy rock cutting, requiring an excess cost for construction over existing cost of \$40,000 to \$50,000, and ignoring land values. That would give a yard on a branch, without access to navigable water, and add tremendously to the cost of opera-

tion of the yard; I have no means of computing the added cost of operation; it would be substantial. By navigable water, I mean navigable harbor.

Riggs.

Recross-examination.

By Mr. Wykes:

In estimating the excess cost of \$250,000 out of Houghton, I prepared countour maps which enabled me to plat several profiles, and the facts given were based on the study of these, determining the feasibility of different lines and the approximate yardage of earth that would necessarily be moved in their construction. I made no measurement on the ground, further than to, every few hundred feet, make notes as to the condition of the hill, the distance of the foot of the slope from the center of the tract, and the approximate rate of slope of the hillside, to enable me to say from my knowledge that the maps were correct.

I ran no line, and made no surveys or locations, either at Houghton or at Marquette. I made a careful reconnaissance of the ground, and based my estimates from notes taken by me, and from

Government and other maps which I had with me of the ground, so that, to my own satisfaction, I verified the conditions disclosed by the contour of lands upon the maps. From my study of the topographical maps, and from going over the line of plaintiff and inspecting the cliff, and its height and location, I have formed a judgment that the excess cost of construction would be as I have stated. In my judgment, the cheapest possible line into Houghton would have to be located on the hill side of the D. S. S. & A., as near as possible to the existing line. In making my assumption, I have located it as nearly as possible to the South Shore without interfering with any existing structures or railroad use of the land now occupied by South Shore.

That location would force the line to a level, 30 to 40 feet higher than the present South Shore tracks. My estimate is based on the difference of cost of physical construction between South Shore road and another line as nearly as possible to that location, but so located as not to interfere with any railroad use of the South Shore land.

I made quite an elaborate study of both situations; I spent a couple of days of the ground at Marquette, and a day on the ground at Houghton, and two or three days in the office, besides having cross-sections made by assistants, and made quite numerous figures upon which I base my answer. Those figures are not what I have given, but I have used them to predicate my judgment upon; I have not all those figures with me, but have certain maps, profiles and cross-sections with me.

I have made numerous estimates, but have not made up any complete estimate showing the details for the figures given for Marquette or Houghton, but I have in mind quite clearly the approximate earth quantities and the differences in elevation, and upon

those I predicated my answer and judgment. I can give some of those figures. I have simply the result of a whole lot of study, and I don't know that I have them all with me. They are based upon the most available and cheapest line that it would be possible to get in, without interference with the existing property of the South Shore.

That line I located as approximately 75 to 100 feet away from the South Shore line, and substantially parallel to it except at the yard. From Pilgrim River to the terminal property, the yardage figures from the lowest line I located was 118,684 yards of pay earth, as against 21,056 yards on the existing line. There is no surface condition upon which to predicate a classification of the material; I did

not attempt any.

That line is about half the total length of the line from Pilgrim River to the point where the new yard would have to be located, and takes us to the easterly end of the terminal. I figured that to get a suitable height for a yard it would be necessary to go 1.5 miles beyond that. I estimated, roughly, that it would require 300,000 additional yards of grading to get a satisfactory suitable line to a proper place for a terminal yard, part being due to the extension of the line 1.5 miles beyond the present terminal; that part being close to a half.

I haven't that line delineated on any map so it could be used as an exhibit; I could prepare it without much difficulty. To check it, it would be necessary for any one else to go on to the ground and make his own study, as I have done. He must, to estimate the same thing as I have, know where I placed my line; as he went up the hillside, his quantities would become greater. When I say the land would be parallel with the South Shore, I mean generally, not exactly.

I included, also, the excess cost for waterways and minor drainage. The question of classification at Houghton is difficult, as the slopes are in a condition of nature, covered with timber and brush. I assume that there would be a considerable percentage of classified material—that probably one-third would be classified material, at an average price of twice the earth work. The fact is, there is a possibility of finding rock, undisclosed today. I assume there the lightest line would have 487,000 yards of total pay earth, 40,000 to 50,000 solid rock, and a considerable amount of loose rock.

The line at Marquette was one which followed the contours among the hills, to the nearest point where there was suitable ground for a yard at Marquette. This yard would be, perhaps, 1.5 miles from the present yard. I also assumed the line among the hills terminating at the present southeast yard. That involved less quantities, about 300,000 yards, the estimate for that being slightly over \$260,000.

For a distance of a half mile from Chocolay River toward Marquette, the ground is flat, considerable swampy, and from 15 to 20 feet above the lake level. There is also considerable flat land at the Carp River, to use which would require a considerable fill.

The southeast yard of plaintiff was the yard of the Marquette &

Western. The D. M. & M. came into the same point, while the west yard was that of the M. H. & O. The combination of the three roads into the D. S. S. & A. resulted in the two yards. The main receiving yard for ore is the west yard, while the other yard is in use as the principal freight yard and for empty ore cars.

(Witness testifies to changes in mileage of branch line, June 30, 1911, to June 30, 1913, resulting in increase of 15.41 miles.)

All of the branches stated are freight branches, and a considerable amount of branch line has disappeared and been replaced by other branches in the two-year period; that change goes on more or less every year in operation. Every railroad has a constantly changing mileage of such secondary tracks as these. There are no passenger branches, except the Republic branch, treated as main line, which is joint freight and passenger, and remains unchanged.

I think the practice of plaintiff is to treat each sidetrack as an independent item, making a charge to additions for all lines constructed, crediting additions and betterments and charging operating expenses for all items taken out. The I. C. C. prescribes the general method of treating this account. Plaintiff keeps accounts of each

separate sidetrack.

I am not clear that my answer, that it was charged to operating expenses, was correct. I think the practice is to credit additional and betterments with the line taken up and charge operating expenses with the actual cost, if known, or the estimated replacement cost,

as of the date of the change.

In filling structures whose height exceeds 20 or 24 feet, it would cost more to make the fill than the value of the structure in the 1911 appraisal. If it was a low structure, eight or ten feet high, the cost of replacement would exceed the cost of filling. The fill makes a better structure; the trestle is still in, but the fill alone is appraised. The structure makes it possible to fill at less cost than if there were no trestle in existence.

I made no investigation of the actual cost of moving the yardage to fill these trestles and bridges. Plaintiff has been doing a very large amount of work with steam shovels and trains, not only

186 filling these trestles, but widening the shoulders of fills, in connection with the re-ballasting operation; this work has gone over a period of several months, and a great deal more money, in the aggregate, has gone in than has been included in the appraisal. Much of it is in the nature of replenishment of banks, and I have made no attempt to add anything of that sort. I have made no attempt, whatever, to analyze the costs of plaintiff's work.

The strengthening of bridges and trestles by adding new stringers was to permit the safe use of larger locomotives. The typical construction was two stringers under a rail; a third has been added, adding substantially 50% more carrying capacity on all the wooden structures. This was done to all main line bridges and trestles, ex-

cept a few.

Mr. Cadarette reported the additional timber. After inspecting every bridge, the quantity was estimated, and the unit prices applied.

There was no attempt to ascertain actual cost, though that was considerably in excess of the cost of placing the stringers if the bridge were built new. The cost of additional stringers should have been carried as additions and betterments; there might be a fairly intelligent estimate of the actual cost made, but I made no attempt to do so.

Bridge 186, page 50 of Complt.'s Ex. 1, Riggs, was built over, new, since 1911. That was in, in 1911, at, cost of reproduction, \$2,167, and present physical value, \$1,182, or about 50% of condition.

Bridge 179, page 50 of Ex. 1, had timber abutments and trestle. It was given concrete abutments, and 109 feet filled, and was carried

it 1911 at, C. O. R., \$3,524, and P. P. V., \$2,706.

Bridge 94D has been replaced by a new bridge, and is in, in 1913, at \$18,830. I do not know whether that is actual cost. The previous structure was, in 1911, C. O. R., \$7,514, and P. P. V., \$3,809—50%, except iron.

Trestle 240, page 76 of Ex. 1a, was entirely rebuilt in 1911; C.

O. R., \$323, and P. P. V., \$166; timber 50%; iron 70%.

Bridge 20D, page 57 of Ex. 1, given concrete abutments since 1911, was carried in 1911 at, C. O. R., \$1,220, and P. P. V., \$1,040; it is now carried at a lower cost of reproduction, and is a better structure; as the price is less than the old one, there would be no charge to additions and betterments.

Trestle 295, page 84 of Ex. 1. C. O. R., \$1,428; P. P. V. \$749;

given new plate girder and 79 feet filled.

Bridge 314. The steel was strengthened, at a cost of \$7,005, to

take care of heavier equipment; it was a rather light structure.

Bridge 317, page 62 of Ex. 1, entirely rebuilt, and 177 feet filled; in 1911, C. O. R. \$10,430, and P. P. V., \$5,789; timber, 50%, and iron, 74%, in 1913; cost \$18,500, which I think does not include filling.

Bridge 319, page 63 of Ex. 1, entirely reconstructed, and 353 feet filled; in 1911, C. O. R. \$11,593, and P. P. V., \$6,465; timber, 50%;

piling on abutments, 64%; trestle approach, 54%; iron, 77%.

Bay Mills trestle, page 74 of Ex. 1; 1911, C. O. R., \$73,410, and P. P. V., \$38,501; timber, 50%; iron, 62%; omitted from 1913 appraisal. The use has been discontinued. The traffic doesn't warrant maintaining the line at Bay Mills, and extensive repairs would be necessary to put the trestle in condition—more than is justified by

the traffic.

There were 73 new closed culverts in 1913 appraisal, all on pages 29-34 of Complt.'s Ex. 1a, Riggs—given the same numbers as in 1911. These structures are all new construction since 1911. Two culverts built prior to June 30, 1911, were omitted in 1911; they are, page 32 of Ex. 1a, C. O. R., \$1,349, and P. P. V., \$1,285, and page 33 of Ex. 1a, C. O. R., \$4,629, and P. P. V., \$4,-346. Of the 73 new closed culverts, some are clearly replacements of old timber culverts, in in 1911 appraisal and taken out. Possibly a few are new where there was no previous structure.

Tie prices were increased from 34 plus cents to 40 cents; the hauling price is included as 5.5 cents, made up of the same items as in 1911, and intended to cover handling from point of delivery on line along-

side road to material yard and to point of use. The material yard

is the point of distribution.

I allowed one cent for inspection, and for loading, unloading and handling—loading the tie from the track on to the train to carry it to point of distribution, and unloading at that point—2¢, and transportation 2.5¢. The transportation out from the point of distribution would be in track laying and surfacing—not in this item.

In getting the 1913 price of 40ϕ , I took a simple average, and did not weight the averages as between the classes of ties—cedar, tamarack and hemlock. The average thus obtained was used as the basis of my judgment. In my judgment, the 40ϕ price is conservative, and very much less than should be used on the assumption of reproduction, as it is practically within a fraction of a cent of what the company has been actually paying, assuming the 5.5 ϕ for handling, etc., correct. Reproduction would involve a much larger martial.

ket, with more difficulty to secure ties, and, unquestionably, the price would go up materially, so that, on a strictly correct reproduction basis, the price ought to be nearer 50¢. This is due to the fact that the demand for ties produced by a large amount

of construction would increase the price.

The 40¢ used is 3.06¢ higher than the actual cost of tamarack ties for a five-year period, allowing arbitrary of 5.5¢ per tie for handling. A small percentage of the ties purchased in last five years were tamarack; I don't think more tamarack than cedar were purchased. I haven't the figures here indicating tie purchases, and possibly I spoke a little too positively; but there have been large purchases of cedar, very much larger of hemlock and, in some years, the cedar purchases exceeded the tamarack. When I say purchases, I am referring to ties laid.

The 40¢ is .73¢ higher than average cost of hemlock ties laid for five years, after allowing 5.5¢ arbitrary and 4.23¢ under average for cedar ties. Tamarack is 36.54¢, hemlock 39.27¢ and cedar 44.23¢. The additional ties in 1913 is due to 15.41 miles of branch line.

If actual prices of ties bought by plaintiff in small lots during last six years were computed, the average prices by reason of the large number of hemlock and tamarack ties would, if applied to all the ties on the road, produce a figure lower than the 40¢ price used. I have made no computation to find the amount of that. I do not believe such computation would be a correct method of arriving at the value of the ties on the assumption of reproduction; if that were to be done, the same thing should be done for bridge and other ties, where I haven't used the excessively high price. My 40¢ price is affected, to the extent of .75¢ to 1¢ a tie, by the increased price due to reconstruction.

There has been very extensive re-ballasting west of Marquette, the work consisting of widening many of the embankments, filling out some sags, and re-ballasting. This territory had been previously ballasted, and, except as there may have been a few miles of sand ballast track lifted, it was in the nature of re-ballasting, and no change was made by me, as substantially all the mileage had been included as ballasted, and because ballasting was not de-

preciated. I did not consider that I was justified in making any addition to the appraisal by reason of this work of re-ballasting, which, in effect, in some places, goes almost to the extent of a change of grade. Minor sags have been lifted out, up to a height of two or three feet. The only additional ballast quantities are due to the

added 15.41 miles of branches and .75 miles of side-tracks.

In Michigan, over 50 miles, from Lake Gogebic east, was ballasted in the years 1912-1913; there was also some work being done near Thomaston, and east. The 50 miles done the previous year (1912) was from near the state line, or from Thomaston, east. It was necessary to do that, as the main line from Nestoria to Duluth in 1911 was much more nearly like a branch than the Houghton branch; that is, the high class maintenance had been on the line from Marquette to Nestoria and Nestoria to Houghton, and, while the line from Nestoria to Duluth was in safe operating condition, it had reached the point where it needed considerable tie renewals and considerable track surfacing, and some rail changes, and it was not what would be called a high class main line track, suitable for the running of sleeper service.

It was not in quite as good condition as the line east of Marquette, in the maintenance of joints; there was more hammering noticeable. Then, too, there were a number of stretches of track that had minor sags which have been taken out, and the property has gen-

of condition, to permit the running of faster passenger trains, and improve the passenger service, I judge, and to permit the hauling of heavier freight trains. I think it was, to a considerable extent, to permit the advantageous use of the new locomotives, and to a considerable extent there has been an increase of tie renewal that might be traced to the use of the heavier locomotive. The renewal of the stringers on the bridges was due to those locomotives, wholly. The new ballasting west of Marquette would vary all the way from a two or three inch lift up to as much as three feet, with, perhaps, an average of seven or eight inches; I may be a little high on my average. This is all gravel ballast.

The Marquette passenger station is located wholly to passenger business. The second story is used for offices of Superintendent, despatchers, Car Accountant, roadmasters and map room, and is in common service as between passenger and freight. The lower floor is exclusively used in passenger service. The greater part of the expense of the building has gone to the passenger service. Any building as modern in character, and giving the same amount of space to passenger service, and no space to offices, would cost a greater part of the money that has gone into this structure. In this case, the general service is incidental, and the primary reason for the building

19 the passenger service.

I don't think that rule should be applied to allocations throughout this case. The application of the same rule, as just stated, to the Dead River railroad, would assign a small portion of the Dead River railroad to common; this would assign a small portion of a depot to common. It seems to me it would work back with equal fairness to

the Dead River railroad proposition—that, in a way, they are somewhat similar. There is no question that there should be some allocation of the passenger station to common; I don't know how to make it. The officers and people using the upper part of the station have to cross the land upon which the building is located, coming in, on the same class with the passenger, from Third or Front Sts.

The dispatching done from this upstairs of the Marquette station may extend over the whole road, to Duluth. Certain of the general officers located there have supervisory duties over the whole road. The dispatching done there is for all classes of service, including ore.

as is the Superintendent's and roadmaster's work.

Certain general officers are at Duluth. Ordinarily, throughout the appraisal, where there is a passenger station and separate freight building, I have allocated the passenger station exclusively to passenger service and freight building exclusively to freight, notwithstanding there are telegraph offices and agents' offices at both. There is a telegraph office used incidentally for Western Union business, and also for dispatching, in many of the buildings allocated to passenger. I wouldn't expect it to be the general rule that the telegraph offices are in the passenger stations; on most roads, it is the other way. There are telegraph offices in the freight stations at St. Ignace and Ishpeming, and I think in no others. In the smaller stations, that have telegraph offices or instruments, the work is done from the passenger station.

The general rule is, in railroad practice, to employ one man as agent, who solicits and cares for freight business and sells tickets and does telegraphing. He may have one or two assistants, and will use the one office that is provided, generally in the station building, combination or passenger depot, as the case may be. Only in the larger

towns would there be a passenger and freight man, and I
193 wouldn't expect to find a man employed for exclusive freight
in any of the small towns on South Shore. In general, where
a station is subject to use by telegraphing and dispatching, and the
only agent has his office and headquarters in the passenger station,
I have made no separation so as to attribute any part of it to the

freight business.

In schedule 19, I have made no changes in price, except in one instance, due to erroneous description, in 1911. The new engine-house at Soo, \$22,046, replaced the old enginehouse, carried in 1911 at, C. O. R., \$28,800, and P. P. V., \$23,040; the number of stalls was reduced from 16 to 12, and half the cost was assigned to South Shore in the new structure, but all of the old, which was erroneous. At the Soo, there were a roundhouse and a cinder pit eliminated, and there was a new roundhouse, cinder pit and other new structures. All of the new buildings at the Soo were included at cost.

The 1913 appraisal shows a new enginehouse at Thomaston, \$16, 370, not completed June 30, 1913, included at cost, and having 11 stalls. The amount stated is the cost to June 30, and the total cost will be around \$30,000. The old enginehouse at Thomaston contains 15 stalls, was appraised in 1911 at, C. O. R., \$24,000, and

P. V., \$18,000, and has been torn down. The old house was in need of a new roof and doors, and the depreciation accrued on it. \$6,000 was sufficient to put it in shape to run for many years, but that and the house at the Soo were both scrapped, because too small for the new locomotives; the depreciation by obsolescence was complete between 1911 and 1913.

It is 16 miles from Thomaston to west state line; there is an enginebouse with four stalls at Superior, but no others in Wisconsin. There is 107.15 miles of main line in Wisconsin, and the enginehouse is

located at the extreme end of the line there.

194 I made no allocation to Wisconsin of any property located in Michigan, and attributed no part of the Thomaston roundhouse or Marquette shops to Wisconsin. The shops are common to the whole road. Thomaston is 86 or 87 miles from Nestoria; Thomaston is a division point, service running there to Duluth and east to Marquette; a part of the service runs straight through. The Thomaston roundhouse would be used in handling locomotives running from Thomaston to Duluth. The shops at Marquette are the only general shops on the line; there is a small equipment of tools-a few hundred dollars' worth-at Superior, for making repars to equipment to carry it back to Marquette, but all rebuilding and major repairs, as to cars, locomotives and miscellaneous equipment, are made at Mar-There is repairing equipment at Houghton, the Soo, and at quette. various points along the line.

No part of the Marquette shops, or ground on which they stand, or tools or equipment in them, has been assigned outside of Michigan; a division between states on some basis of use might be arrived at. The work of these shops is mainly on rolling stock, but they do all of the cutting and trimming of rails used as relayer. I am inclined to think a track mileage basis would assign an overly large proportion to Wisconsin. The assignment should be on the basis of use. I think the records of the shop operation would disclose some equitable

basis.

The new coaling station at the Soo, costing \$6,650, superseded one carried in the 1911 appraisal at, C. O. R., \$6,082, and P. P. V., \$4,-234—timber, 65%; embankment, 100%.

I allocated the right of way to ore dock No. 4 to exclusive freight. It is now being used for the delivery of freight to the Roach & Seber warehouse. It will be possible to develop a business on that

do not think that the business of that one warehouse. I do not think that the business of that one warehouse would justify plaintiff in buying the land at the figure named by me in 1911 and building the track to it, but I believe that business may be developed which will justify the continued ownership and maintenance of that track.

I don't think, considering the warehouse and the stores abutting on this track, that the track would ever have been put there without the ore service, on account of its involving an expensive subway. The point of connection of No. 4 ore dock track runs half way into the block between Fourth and Fifth Sts., allocated entirely to common.

There is, perhaps, 40 or 50 feet of track outside the clearance in that block, allocable to freight.

I made no attempt to make detailed comparison of original costs the records were not available. I have tried it several times, for small portions of line on other roads, and some years ago came to the con-

clusion that such method of appraising is impossible.

We know certain things that would make the original cost higher than the present cost, and other things to make it lower; to know whether it would cost more or less now than 30 years ago, and to give definite final answer, you must have all of the elements of unit prices as of the time of construction, and practically make an estimate as of that time. Until you have that, any figure of estimated original cost is in the nature of a guess. The largest item in the last analysis is labor; the ties, rails, timber, etc., have labor in them; in its last analysis, if all the structural materials in the South Shore were taken in a state of nature and reduced to the condition in which we find them in South Shore, over 90% is labor. I investigated no prices on South Shore, from its books or otherwise, of any of its construction 15 years ago.

I did not intend to make as sweeping a statement as you seem to have construed it, to cover the general cost of the road; I said that I felt that, owing to the piece-meal construction, and owing to the condition of the country, having been covered with timber at the time of original construction, and thereby adding greatly to the cost of earlier surveys, and especially the piece-meal construction and the large structures, I was quite certain that, if original cost of engineering could be shown, it would be in excess of my estimate; but I did not intend to go so far as to say that original cost for the help would necessarily be in excess of reproduction, although it might bethere is a possibility.

My 4% for engineering was intended to cover everything, including preliminary. I think it conservative—low enough, and fair. On 30 miles in Indiana, the cost was 4.25%, and I have known the percentage to go as low as 2.75%. The average, I should say, at present, is considerably in excess of 4%; that is fair for such a property as South Shore, and would be high for a railroad in the west, where the country is open and construction light, and low for work like

Lackawanna is doing in New Jersey.

In construction of South Shore at present, the cost would be likely to go above 4%; engineering has increased in the last 12 to 20 years, due to more complete engineering; employees are higher, and there has been marked increase in the employment of high class consulting engineers.

Description 13, Marquette County, Complt.'s Ex. 1b, Riggs, and Complt.'s Ex. 6a, Riggs. There is a little more than half the land owned by the railway company west of the westerly track that is not in use for railway purposes, and that is in a state of nature. On the

north line of Ely lot, it extends 300 feet and on the south line 250 feet from the most westerly track to the back end of the lot; one-third of that is in use, carrying embankment, and the

balance would have to be acquired in acquiring the front, and is

necessary for any extension of the yards that may be made.

Description 14, Marquette County, 850 lineal feet of water front outside the breakwater. When breakwater is completed, this will be well inside it. The greatest width of this water front from the most easterly track in the hard land is, at the point of rock, 250 feet. There are no structures of any kind on this water front. It would require the removal of considerable solid rock to put any railroad structures on the northern end of it.

Description 15, Marquette County. (Quotation from affidavit of witness of April 12, 1912, in which it is stated: "He included in his inventory another tract which lies on the lake front * * * valued on the basis of its foot frontage." Some of this tract is used for railroad purposes, but the exact acreage deponent cannot now teli.) I had in mind, in making the affidavit, the riparian rights of the water front opposite Burt and Fly's Add., where there is no use of riparian rights, and the non-use of a small amount of land between the site of ore dock No. 1 and the Ely lot; that would fall on descriptions 22 and 14.

Description 33, Marquette County—also 32. These descriptions are, in part, used as piling ground for material. That material would be included in stores and supplies, which were located between Wisconsin and Michigan on track mile basis.

There is a constant change going on, on every railroad, in the length and location of side tracks; some are more or less temporary,

and in some industries there is more or less steady shifting of track. There is a frequent change of sidings which serve the mines, so that every year there are three or four miles of side track taken up and a corresponding amount laid in some new location.

In cases of the establishment or abandonment of an industry, there may be a large increase or decrease, but the normal changes on an estimate won't vary much from three to five miles a year. Passing track and yard tracks are more permanent, the changes being likely to be additional tracks.

Riggs.

Redirect examination.

By Mr. Eldredge:

As to the line from Pilgrim River to Houghton, I have assumed that the land acquired by plaintiff in acquiring its right of way, and between the highway and the railroad, might be available outside the limits of the actual roadbed of the South Shore, and I have assumed the use of such portion of the terminal as might be used without interfering with existing tracks or buildings thereon. I will lay out the proposed line on a map, and furnish it to defendants.

I took into account possibilities of a line from L'Anse to Houghton. In my judgment, it is impossible to get any line crossing the

range of hills that runs back from Houghton for a number of miles, without heavy work, excessive length of line, and greatly increased expense. It is impossible to get a line in the hills near Houghton without much heavier expense than involved in paralleling South Shore. There is no difficulty in locating a line to Chassell, and from there to Pilgrim River, which would be substantially equivalent of South Shore in cost. The line I have estimated was upon the cheapest line, Pilgrim River into Houghton, and provided a suitable

yard at Houghton. I considered lines commencing east of
199 Pilgrim River, but did not lay them out on paper, or prepare
profiles or estimates, because a line in any other general
location than that of South Shore would involve longer distances,
heavier territory, and greater cost. This I was able to determine
from general knowledge of the country, without reference to pro-

file maps.

In Wisconsin (at Superior) are six roundhouse stalls. Six or seven stalls at the Thomaston house will, with the Superior house, house every locomotive engaged in interstate business. There being 13 allocated to the interstate traffic between Michigan and Wisconsin, and taking into account the engines in service on the road, six stalls at Thomaston and six at Superior would be more than ample to care for the present interstate business. I think no engines are

engaged exclusively in Wisconsin business.

I have often made estimates upon the basis of time required to do the work, the number of men employed, and probable cost. In fixing a price I was making for engineering work to be done, I have several times been called upon for such a figure. I have so estimated the cost of engineering work of which I was to have charge. My adoption of 4% for engineering was based upon my experience in engineering work and knowledge of engineering cost. I cannot say that any computation, estimating the number of men required, etc., has led me to this particular 4%. Where I have made a computation, the percentage has varied, depending on the size and character of the work, from below 4% to as high as 10%. The difficulty in estimating in such an instance as this is the large and expensive structures; if they could be eliminated, it would be comparatively easy to estimate the engineering required to reproduce the line, grade, bridges and ordinary track construction.

200 On description at the Soo, there was allocated 1.5 acres to passenger, 8.91 acres to common, 1.65 acres to freight, and 5.39 acres questioned. A correction should be made, deducting from the common 4.9 acres, and transferring it to freight, making the common 4.01, freight 6.55, passenger 1.5, and questioned 5.39.

With this change, parcel 7 is correctly allocated; the dividing line is erected at right angles to the center line of the main track. That covers all changes at the Soo in addition to those made at the hearing, except the allocation of sidetracks.

At St. Ignace, on description 7, 72 acres should be transferred

from common to exclusive freight.

At St. Ignace, a portion of description 8 should be allocated to freight. I have allocated the north freight yard, that portion of

the description north of the main track, 6.72 acres, leaving the

balance of 49.81 acres common.

Description 5, Complt.'s Ex. 6a, Riggs, Marquette. In stating no riparian rights are used here, I meant there is no track on this land, and no construction from it into the water. The hard land is essential as supporting the track immediately adjoining in Lake St., and the entire frontage has been riprapped with stone by plaintiff, which stone extends into the water. I included nothing in this appraisal, or in 1911; Mr. Hansel included \$1,700 for riprapping on this mile. In stating there was no use of riparian rights, I used the expression bearing upon the fact that there is no structure into the water for commercial purposes, or connected with navigation.

Description 7, Complt.'s Ex. 1b, Riggs, Marquette County. I have extended the land allocated to exclusive freight to a point closer to the main line; I would change the allocation by giving 15 lots to common service and 32 to exclusive freight.

Description 12, Complt.'s 1b, Riggs, Marquette County. Corrected to transfer four lots from common to exclusive freight. I have put all the land to the west of the main track, laying off half the distance between the main track and the next track westerly, extending from Jackson to Mesnard Sts., and assigned everything west of that land to exclusive freight.

On January 19, 1914.

Riggs.

Cross-examination resumed.

By Mr. Wykes:

In Complt.'s Ex. 1c, Riggs, I have followed Complt.'s Ex. 1b, Riggs, in allocations of land as between non-railroad use, passenger, freight, ore and common. Ex. 1c sets up in parallel columns the land descriptions as appearing in Complt.'s Ex. 1, Riggs, 1911, Defts.' Ex. 15, Hansel, 1912, and Complt.'s Ex. 1b, Riggs, 1913. On Ex. 1, the parcels were not numbered; I have now numbered them, beginning with number one, at the top of, and running consecutively through, each page.

Mr. Hansel's numbers start with item 1, and run continuously through the land description. Complt.'s Exhibits 1b and 1c begin a new series of numbers for each county, and run consecutively through the county. Ex. 1c permits comparison of the land included

in each appraisal.

I have placed no land values since Complt.'s Ex. 1. I have prepared a statement showing each sidetrack, with length, allocation to class of service, and, where freight sidetrack is located on land allocated to common use, the acreage that should be allocated to

freight by reason of the sidetrack. This involves a change of classification of a large number of smail items of land, aggregating, perhaps, 75 acres. In my previous exhibits, where an exclusively used sidetrack fell on main line right of way, I made no allocation of the ground on which that sidetrack was

located, but treated it as common, invariably. The exhibit I have now prepared locates such land as between passenger, freight or common.

Where an allocation of property becomes necessary, it is consistent to make an allocation of land occupied by freight sidetracks to freight, though many of these sidetracks are temporary in nature. In the great majority of sidetracks, the amount in dollars and cents

is comparatively unimportant.

I made no further allocation in Marquette, as I think those already made cover all the land occupied by exclusive use tracks, where it is possible to allocate land to the freight service. In certain classes of track, no allocation can possibly be made to freight; e. g., a crossover letween two main lines may be used exclusively for, and be properly assignable to, freight, as far as the track is concerned, yet the track occupies common land, and may be so located that it is impossible to stand a freight car on it without interfering with the movements of trains on the common track.

There are 15 or 20 such tracks on the line in Michigan; the same thing is true of a hundred or more feet of the length of every side-track, where it leaves the main line. It is impossible to allocate to freight land occupied by main line track and necessary to the passage of a train over the main line. These instances, while numerous, cover a small acreage of land, if the allocation to freight is made to run through (to) the clearance line of the main track. All side-tracks, spur and branch line lengths are measured from the point of the switch. In allocating land under sidetracks to freight

203 use, I have taken a line seven feet from the center of the main track as being the limit of actual use by the passage of a train over the main line, and have assumed a total distance from the

point of the switch to the clearance line of about 150 feet.

For sidetracks which lead off the right of way and do not parallel the main line, I have assumed a width of 25 feet, and have allocated an irregular parcel, 25 feet wide, commencing opposite the point of the switch, giving a narrow strip of land there, widening out to 25 feet, 150 feet from the point of the switch and full 25 feet from The 25 feet, in my judgment, properly covers the track and embankment. For sidetracks paralleling the main line and remaining of the right of way next to the main line, I have taken a strip of land running from the seven foot clearance line out to the right of way line, commencing at the point of the switch and running through to the point of the other switch, giving not only the land occupied by the track itself, but all of the land to the right of This, I think, gives rather too much land to the freight, but it is done on the assumption that access to the sidetracks is necessary to unload cars, and that such access is freight service. are used for storing cars, this would assign more to the freight than A small triangle at each end, opposite the point was actually used. of the switch, is, in reality, common.

My first allocation was on the idea that the freight track was a temporary facility, and that its presence did not interfere with the entire use of the right of way by the joint service; but, if allocation is to be made, I do not see that it is inconsistent to allocate the land under freight sidetracks to that use temporarily. In every case, I assumed that the point of clearance would be 150 feet from the point of the switch.

In the allocation of sidetracks and spurs, the items of construction are the track, and any allocation made of the track would carry with it all items in the schedule that pertain to the track; this includes clearing and grubbing, grading, ties, rails, track fastenings, track laying and surfacing, ballasting, etc. The land, except switch leads and cross-overs, may or may not be allocated to the sidetrack or spur; that is a matter of opinion; I see no inconsistency in doing so, but I do not see how any allocation of land within the limits of clearance of the main track can be made to sidetracks.

On page 126 of Complt.'s Ex. 1a, Riggs, official cars are allocated as passenger; I think those should be considered as common. I have allocated no locomotives to ore service; some locomotives are used for a part of the year in exclusive ore service, but during season of closed navigation the major part, if not all, of that equipment is used in freight service. If any are allocable to ore, the number is small, and due to the fact that such locomotives would be out of

service when not in ore use.

The allowance of 1,300 feet beyond the end of the switch at stations was to permit the working of trains on the main line, going into or coming out of the yard. A passenger train of five coaches would be 360 to 400 feet in length.

In making 1913 exhibit and inventory, a more careful survey of the road was made than previously. I cannot give you the items found in this more careful inspection, that are omitted from 1911

appraisal; that will show up on a comparison.

The instances which I have in mind of items that were omitted were two quite large culverts, which were not included in 1911—the double lines of 48 inch pipe on the Houghton branch and the concrete culverts just west of Marquette yards, both of which

were put in prior to 1911, and omitted (evidently, C. O. R. \$4,629, and P. P. V. \$4,346, on the first). There were also quite a number of minor structures, in buildings, that we found.

I do not think, now, of any items of appreciable size left out in 1911 and found in 1913, that I have not already testified regarding. I feel that, in the main, the 1911 inventory is a creditable inventory; there were a few errors of omission, and a few errors of inclusion of items not properly included, and those, I think, have mainly been corrected in 1913.

I don't think the tickler noticed at Marquette as having been cmitted in 1911 was included. I think it possible, if time were spent, covering the ground, and taking several weeks, for a full inspection and a careful checking of the inventory, that it would add a large number of minor items, like that tickler. The riprap at Marquette and at Michigamme was again omitted in 1913; it should be in. The masonry for a bridge at Iron Bridge, or at one of the Ontonagon River crossings, omitted in 1911, has, I think, been corrected. The minor items, such as the tickler, which, if new, might

amount to \$400 or \$500 for the whole road, road crossings and structures of that sort, that we omitted, would not amount, in the aggregate, to any great sum. I feel that the large items are substantially correct.

You asked me a question in regard to omissions from the 1911 inventory, and I have in mind the fact that you wanted the buildings. Now, I have looked over some of the other schedules, and I noted a few of the omissions in the 1911 appraisal that I would like to call your attention to, in connection with my answer to the question last night.

In the land, there was omitted, in 1911: Fiborn Quarry branch, 22,75 acres; track rights, Lake St., 7,416 feet; Marquette 206 Quarry right of way, .87 acres; Negaunee and Palmer branch

track rights, 5,400 feet; Mary Charlotte branch track rights, 4,400 feet; Milwaukee Mine branch track rights, 9,200 feet; gravel pit, Covington, 20.3 acres; all included in 1913. Lot 6, block 4, Ishpeming, omitted both in 1911 and 1913. (Several of these were discovered and inserted in the course of the 1911 appraisal or testimony.) The riprap at Marquette and Michigamme was omitted

both in 1911 and 1913.

In 1913, there was intentionally omitted the work that has been done since the appraisal of 1911 in connection with the widening of fills, and so on, 70 miles of line west of Nestoria; a very considerable yardage of earth has been added in that work. I think it should appear under grading, and, in case of a re-measurement of all earthwork on the road, would, in my opinion, very greatly increase the number of cubic yards of earthwork, as estimated. It was done in connection with re-ballasting. I added nothing to my ballast estimate on account of the new ballast; nor the graduation on account of it. I know, and was over, the general territory covered; I should say it was in the hundreds of thousands of yards—a large yardage.

In bridges, trestles and culverts, there appear in the 1913 schedule 73 culverts which do not appear in the 1911 appraisal, all of which have been built within the last three or four years; how many of these were in place in 1911 I have no means of knowing.

Additional braces were added to bridges, making a very considerable increase in timber, but the difficulty of securing the data to make a reliable estimate was so great that no attempt was made to

do it

In 1911, there was no inclusion for bridges, trestles and culverts on branches; nor is there any in 1913. There was, in fact a number of culverts on the Palmer, Dead River, Mary Charlotte and Weidman branches—not large, any of them; the

largest is, perhaps, 10 or 12 feet opening.

On my last trip to Marquette, I noted, in connection with the track approaching the roundhouse from the west, two long culverts, built of logs, an aggregate length of 250 feet, not included in either appraisal. No allowance has been made for furniture or property of plaintiff in Detroit, or in cities other than those along the line of the road, and no allocation has been — to Michigan of any of the general office property located in Minnesota.

Plaintiff has two or three gasoline motor cars which were not included in 1911 or 1913. It also has 12 or 15 track velocipedes, costing \$35 to \$40 each, not included in either valuation. In 1911, a considerable amount of snow fence was omitted. In 1913, the 1911 schedule of roadway and construction tools was adopted, without change; owing to the large number of extra track forces, there is a considerable increase in the amount of these tools. There is no inclusion in 1913 of piping for the pintsch gas at Marquette or the Soo.

In 1913, the old dining car included in 1911 had been rebuilt, and it was included in the 1913 appraisal at \$2,000, which is ridiculous; the car is worth several times that. In neither valuation are items of car cleaners' tools, and numerous minor items, which might be enu-

merated, and which must be there.

A 650 foot siding at Negaunee, north of the north main track, past the passenger depot, has been changed in allocation from freight to common, it being used for storing both freight and passenger

cars.

208 Of the velocipedes which I have said were omitted, I have seen velocipedes on the road, and find the engineering department has two or three, the bridge foremen and linemen some, and each roadmaster one. I do not know whether they have 10 or 15, altogether; the cost is \$35 to \$40 each. I understand there are three gasoline motor cars, acquired since the 1911 appraisal; I do not know the cost.

As to the furniture in the offices of the line, I do not know what they had in the way of offices, other than at Detroit. My information about the Detroit office is by having seen the sign. I do not know who

holds the title to the office property.

The tools which I say were omitted are capable of inventory.

The pintsch gas pipes are capable of inventory, and have been installed at the Soo since 1911 appraisal. There were items of property included in the 1911 appraisal that were omitted in the 1913 appraisal; they were included in 1911 on the theory that I should include in the report all the property in the service of the property and transportation, or which was, in my opinion, reasonably necessary for that service, or which had been or might be used, on the theory that the question of inclusion or exclusion of items of value was not an engineering question. I made no explanation of the use of any item in either 1911 or 1913 appraisal, except as I have testified regarding it. I included quite a few items in 1911 excluded in 1913; e.g., the Martel furnace lands and tracks.

Of land, I have omitted quite a considerable number of descriptions that I included before. Items that have been marked as "questioned," and not allocated to freight, passenger or common service, and which are not in use today, and were not in 1911. In minor instances, lands not in use today were in use in 1911, and vice versa.

209 Riggs.

Redirect examination.

By Mr. Eldredge:

I have allocated the land occupied by sidetracks which are used for freight and passenger service, and allocated in Complt.'s Ex. 1a. Riggs; where land occupied by sidetracks was not allocated in Ex. 1b, I have now allocated land occupied by exclusive freight and

passenger sidetracks on such unallocated right of way.

These totals do not include allocation to freight or passenger made, at the previous hearing, on the map, and which are allocated in Complt.'s Ex. 1c, Riggs. They do not include allocations of side-tracks, where the lands on which the sidetracks rest have been allocated to the same service as the sidetracks. They are additions to allocations made in Ex. 1a.

Riggs.

Recross-examination.

By Mr. Wykes:

Passing tracks on South Shore would average about six miles apart; some are less, and some slightly more. The passing tracks are all located to common, and run in length from 1,400 to 2,000 feet. The length of the passing track is regulated by the length of the train which must pass. The freight train, being of inferior class, always takes the siding as against the passenger train; that is not invariable, as, in the case of an extremely long freight train, or where the freight train load is practically at the limit of the locomotive tractive power, the passenger train is often sidetracked.

The meeting of two freights and a passenger, or two passengers and a freight, or a regularly scheduled meeting point of two passenger trains, with any other trains, in the yard, would make the two

tracks desirable. I feel confident that the amount of passing track allocated to common is not excessive, and that it would not be excessive assuming the elimination of freight traffic and the necessity of operating passenger trains under conditions of weather and delays likely to be encountered in the Upper Peninsula, with reasonable prospects of getting trains over the road and making up time. I mean that moving passenger trains, frequently late, which have to make up time, requires frequent passing tracks, that the road may be clear, and that with any passenger movement in the opposite direction long space between passing tracks might, or would, seriously delay the passenger movement.

In other words, the passing tracks should be close together, to permit the trains to run as close together as possible before taking the siding. Having them within six miles of each other permits you to give a free running space of 10 to 15 miles, or even less, while under

other conditions it might take 30 miles.

Riggs.

Redirect examination.

By Mr. Eldredge:

The 20 acres, station grounds at Michigamme, is for the purpose of including the ends of sidetracks and clearance ground at each end; not to exceed five or six acres is used for station buildings, warehouses and other purposes, in the center of the town. In allowing station grounds within 1,200 feet limit, I was not influenced by Michigan decisions as to the extent of station grounds which must be fenced. The acreage was placed for station grounds as being the amount of land within what might be called yard limits—the working limits of sidetracks.

Wherever there is a country village, and a separate item of land, at that point, which includes the total acreage within the side211 track limits, and without the working limits at either end of the sidetrack, I have followed this rule. The value of the land had nothing to do with my determination of the limits of station grounds.

Riggs.

Recross-examination.

By Mr. Wykes:

If you are going to consider clearing as an element of the value of land, as in the case of farm land, where stumps are removed and agricultural land is secured, you must have a good quality of agricultural land, to raise the price equivalent to the amount expended for clearing and grubbing. I apprehend that clearing and grubbing in the case of a railroad cannot be separated from the construction, and, irrespective of what the cost of the land may be, or what the value of the adjacent land may be after it is cleared, the cost of clearing and grubbing remains one of the essential items of cost in building the road, and must be treated in the same manner as grading, or any other expense necessary to fit that land for its use as a railroad right of way or terminal.

On a jack pine plain, where it would be necessary to spend \$40 an acre to clear and grub land that could be purchased for \$2, I do not see how that would raise the value of your land to \$42, as land. It would leave the \$2 an acre as an element of value to the railroad for land, and the \$40 as an item of construction cost in getting the

ground ready to build the embankments.

A strip cleared through a cut-over 40 or 80 acres of land would not add any value to the cut-over lands, as land, any more than the clearing, grubbing and grading of the railroad right of way would

212 add anything to the value of adjacent stump land, or jack pine land, as lands, but I do consider it worth to the railroad what it cost, as an element of construction cost. A strip of cleared land 100 feet wide through 40 or 80 acres of cut-over land of the character of the shrubbery and timber growing along the South Shore would, if left a few years, be grown over again; this indicates that the item of clearing and grubbing requires maintenance just exactly as any form of track construction does. The right of way must be kept clear, on account of fire; also for the vision of the engineer, the non-interference with telegraph wires, and other purposes. It does require constant maintenance, and an un-sual cutting and burning of the right of way to keep it in the condition now on the South Shore.

On February 21, 1914.

Riggs, recalled.

Further cross-examination.

By Mr. Wykes:

In comparing the cost of maintenance of main line switches with a through stretch of main line without a switch, there would be considerably more maintenance at the switch, on account of the necessity of always keeping the main line rails in absolutely safe condition at the switch point and the point of the frog. At the location of the switch there is a higher maintenance cost, due to the fact that there is an increased investment at that particular spot.

The cost of maintenance on a mile of track where there are a number of switches would be markedly more, I think, than on another mile, where there are no switches. The number of main line switches outside of the necessary passing track switches would be comparatively small, and I do not think would appreciably add to the

total cost of maintenance per mile. The added maintenance
213 at the switch is due, primarily, to the necessity of keeping the
main line track in safe condition for high speed movement. A
switch in the back end of a yard, with nothing but slow switching
movement, does not need or receive anywhere near as much maintenance as a main line switch. The wear on the switch and frogs is due

both to main line movements and to sidetrack movements.

Due to the use of the switch, and to the fact that the switch point moves,—is open and closed,—it is absolutely essential to keep that in perfect working order, to permit high speed main line movements over it. Even if there were only movements over it once in a while, more work would be necessary than there would be on an unbroken rail.

All main line switches have lamps, that must be lighted every night and put our every morning; in general railroad practice, that duty falls on one of the station employees, or on the section foreman, if the switch is near a section house—generally, upon some regular employee of the company. At small stations, where there is but one agent and a few switches, it would be a part of that agent's duties to fill, take care of and clean the switch lamps.

The percentages of contingency on terminals and engineering

were, for 1913, 8.8%, and 1911, 7.9%, being, in both cases, the average contingency applied to all other items in the schedule. The increase in 1913 was due to the fact that land, which had borne 5%

contingency in 1911, was not included in 1913 inventory.

I made no study of the car or train mileage of plaintiff for any purpose. I did not investigate the relative passenger and freight train mileage, but accepted the passenger and freight train mile as given me by Mr. Delf, and, further than knowing in a general way about how those percentages have run for three or four years, I have made no study whatever.

I made no study of the composition of trains, train weights,

commodities carried, or things of that kind, whatsoever. I did not, other than as indicated by the train mileage, go into the question of track occupancy by the different services. I made no attempt to determine the time of use by the freight or by the passenger, except so far as I used the train mileage for that purpose. I made no investigation, personally, of either train or car mileage or occupation. I did not investigate the switching mileage, or the stational service.

I did not attempt to separate between the passenger and freight switching mileage other than in the application of an arbitrary percentage. I did not make any investigation of the comparative amount of train mileage, with the commdo-ties carried, in any way. I did not do this, for this or any other railroad, since 1911. I did not ascertain the ore train mileage previous to the testimony in Chicago. I made no investigation, and did not testify in any way, regarding mileage, except as to use mileage figures furnished my by the auditor for making certain arbitrary divisions. I did not examine the increases or decreases, or the relative ratios, of the different classes of train mileage, as between passenger and freight, for a number of years back. I have made no study whatever of the subject of train or car mileage, or traffic.

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On July 17, 1912.

JOHN D. STRADLEY, a Witness called by Plaintiff.

Direct examination.

By Mr. Eldredge:

I am 66 years old; have lived in Soo since March, 1886. Have been in real estate business since 1886; have abstracted titles since 1888; have bought and sold a good deal of property, for myself and as agent. I know value of real estate at Soo; have bought country lands in Chippewa County; as an abstractor, the prices indicated by conveyances of record came to my knowledge.

I know property owned by Sault Ste. Marie Union Depot Co. (Complt.'s Ex. 3, Riggs, shown witness.) My estimate of its value, without improvements, is \$168,000. Have special knowledge of value, by purchasing property adjoining; bought 8 lots last October, Nos. 26 to 33 inclusive, Johnson's subdivision of Private Land Claim 5, fronting Ridge and Emaline Sts. and running through from

street to street, for \$16,000 cash. Depot Co. property is of greater value. I also bought part of Private Land Claim 7, 95.6 feet on Magazine St., running 172.26 feet on Emaline St., for \$8,500; it is not as valuable as Depot Co. property. In 1910, I purchased part of Private Land Claim 7, lot 8, block 3, of Emaline Wood's Add., and cast 11 feet of lot 9, block 3, same, for \$17,000 and still hold it.

I made estimate of \$168,000 by taking values, without reference to railroad or anything else; if you wanted to buy now, in a complete lot, it would cost more. If the railroad and its improvements were not there, I don't know as it could be sold off at that figure, but if it had to be acquired now, by purchase or condemnation, it would

cost more.

I know D. S. S. & A. land extending from Mich. Lake Superior Water Power Co. to Sixth and South Sts., averaging 1,175 feet long by 235 feet wide, 6-1/3 acres. I estimate value of that at \$16,450. I know land fronting harbor, occupied by yard, width varying from 500 to 900 ft., made land extending into lake, total length 2,800 feet, 46.5 acres. It extends from Sixth St. to east line of American Brick Co. land, which is quarter line of section 12 extended, and is colored white, on plat, with red outline. In valuing that land, I divided it, estimating the water front out to harbor line at \$350,000 and the 46-1/3 acres upland at \$1,500 per acre average, or \$69,750; I made the estimate from lot sales in adjacent additions.

I know land extending west from line of American Brick Co., 1,400 feet by 530 feet, 17.52 acres, bounded in red. I estimated that based on market value, \$1,500 per acre, total \$26,280. You couldn't buy it for that. I know land, 1,950 feet by 225 feet extending west of property last described to end of joint yards, 10.7 acres, bounded in

red. I estimated that at \$1,500 per acre, or \$15,105.

A description omitted from Riggs' estimate, is D., S. S. & A. lands Portage Ave. to Water Power Canal, indicated in red. It includes 3 pieces, the triangular east of Meridian St., 75 feet on Portage Ave., that part west of Meridian and North of Spruce Sts., and a little piece, about 200 feet wide between Spruce St, and Power Canal. I valued that at \$32,600. The triangular piece on Portage is described in Complt.'s Ex. 1, Riggs, as belonging to the M., St. P. & S. S. M.; it belongs to plaintiff.

My estimates of plaintiff's property are based on sales in vicinity. In Ready's Add., lots (6.6 to acre) were held at as high as \$500, the average of sales about \$400 to \$500. Also in South Shore Add., lots (6.9 to acre) held at \$350 to \$400. Adjacent and contiguous land of South Shore and Soo Line is adapted to same purposes, and of same value. In Chandler's Add., further west on Easterday Ave., approximately in same vicinity, smaller lots run about the same price. Algonquin, Scranton's and Foss & Hyde's Addition, further east, are shown on map. There are 3 or 4 additions further South and West. The Peninsula Land Co. Add. adjoins D., S. S. & A. on north.

I know of sales, at prices named, in all additions except Ready's. From sales and prices at which lots are held, I estimate my value of

the lands; have some for sale there as agent. I have not sold lots lately at prices named, but have heretofore; what I hold now are held

at those prices.

I know the triangle (10.55 acres) shown in three pieces in Complt.'s Ex. 3, Riggs, owned by Soo line, bounded on north by Spruce St.; parcel described as 1,320 feet by 887 feet, average, less highway, 24.84 acres; also tract averaging 360 feet by 2,080 feet, 17.19 acres; also triangle bounded by Sixth Ave., South Shore Add., and D., S. S. & A., 8.094 acres; also tract between Portage St. and Power Canal, 7.274 acres, belonging to plaintiff. The value of the 5 last named tracts, a total of 69.687 acres, is \$1,500 an acre, or \$104,530.

I know the value of the tract between South St. and Power Canal, 16.356 acres, with which I include .57 acre, north of canal and south of D., S. S. & A. This small piece, omitted from the list, is shown in yellow on Complt.'s Ex. 3. The two descriptions are worth \$52,-

500. I value them separately, by feet frontage. I have knowledge as to that tract, as it adjoins plats adapted for same purposes where lands are held at prices given. I calculated value by squaring it on a basis of 740 feet frontage on South St., next to power canal, and put the value through entire length at rate of \$70 a foot.

I have a general knowledge of lands along South Shore in Chippewa County. I have had over two years' experience in acquiring

railroad right of way.

Q. From your experience, how many times the actual value of the land acquired would it cost for the expenses and damages; i. e., what is the ratio between the value of the land in its naked state and the cost of acquirement? (Objection, that there is no fixed relation between value and cost.)

A. Here, where large blocks of land are owned by one party, it

would be 2.5 or 3 times as much.

Value of rural lands in Chippewa County along South Shore for right of way, including station grounds outside of Soo, would average \$25 an acre, subject to timber rights. If damage and cost of acquirement is added, I think it would cost 2 to 2.5 times as much, or \$50 to \$60 an acre.

219 STRADLEY.

Cross-examination.

By Mr. Wykes:

I figured terminal company's property in feet by lots; it would be from lots 1 to 18 and 21 to 30 inclusive, in block 1 of Scranton & Robertson's Add. I estimated cost per front foot of these lands I bought, and added a little for difference in value of railroad lands. Lots on the west side are not as valuable as those on east side. I figured at \$80 a foot, regardless of depth.

Depot was formerly on Spruce St., way out west end; the business men wanted it nearer town, and they raised a fund to help get it down there. My recollection is it cost the railroad over \$50,000, but I am not sure. Some citizens put as high as \$1,500 in pot.

The first tract, 8 lots, 26 to 33, Johnson's Sub., on which I based my estimate of \$168,000, fronts Emaline St., across from railroad yards; it was purchased in 1911, at a little over \$70 a front foot.

The second piece I purchased, corner Magazine and Emaline Sts.,

south of freight depot, I purchased in 1904, for \$8,500.

The third piece (2 parcels), lot on corner Ridge and Magazine Sts., part of same claim, and lot 8 and the east 11 feet of lot 9, block 3 of Emaline Wood's Add., I bought in 1910. I didn't figure it by foot

frontage.

I have been offered a piece, 52 feet on Magazine St., between the two pieces just described, part of private claim 7, for \$10,000 cash; they won't take less. The business portion of town is more on Portage than on Ridge—east on Portage Ave. and south on Magazine St.

220 A piece recently listed for sale on corner Magazine (208 feet) and Portage (142.6 feet), just east of terminal ground, the owner will sell for \$50,000, or he will sell 125 by 100 feet front-

ing either street for \$37,500.

There is a store building on the south corner of the piece on Ridge St. Buildings are probably worth \$2,000 altogether; there are some old shacks on north corner. To purchase this parcel would cost \$168,000; it would cost more to buy it if they knew you wanted it.

Another sale in the neighborhood was the east 77 feet of lot 7, block 2, Emaline Wood's Add., 50 feet on Fort St., depth 77 feet, for \$1,600. Another sale was the north 30 feet of lot 11, block 2, for \$800; the balance of it, 66 by 50 feet, for \$1,200. Nothing but some little, cheap shells of houses on them, renting for \$6 a month. Another sale was lot 5, block 3, Emaline Wood's Add., for \$2,000; also lot 7, block 3, same addition, \$2,200; also lot 10, block 3, same addition, \$3,500. I think the last is closed; there are two little houses on it.

In the next plat west, Scranton and Robertson's Add., Standard Oil Co., in 1904, bought balance of block 1, that railroad company didn't get—half of lot 31 and lots 32 to 36 inclusive. They paid \$3,600, which was considerably under the price paid for the corner, but Standard Oil Co. built a spur and let former owners have rights

over it

I just picked sales recently made. There are many other sales, but they have buildings, which made price higher. I took sales, as near as I could, to get land value without improvements; some cost more, some less. These transactions I know were made, and I know

the price.

As to the second parcel, a circular piece of 6.5 acres, directly south of power canal, I judge its value on market price of lots in Ready's Add., directly east, and other lots in that vicitity. I didn't see what sales there had been in that addition, or in Shafer's Add., east of that, but know what they hold property at. I have property there for sale at those prices. I have held some without sales for a long time at those prices, and some only a short time.

Lots in Ready's Add, are 35.7 by 105 feet, a little over 7 to the

acre; I figured 6 to the acre, at \$500, or \$3,000 an acre.

I estimated the value of the second piece described, south of power canal, by the lot, on the basis of 6 to the acre, and then put on an average value of \$70 a front foot on the canal. That is less than it would come to, figuring by lots. It averages 235 feet wide. I took the Ready lots to get a basis to figure from. I just put that \$70 as an average of value, without computation.

The parcel of 46 acres, in which I included \$350,000 for submerged lands, runs from shore line to dock line. I figured water frontage at 2,000 feet. I figured it on same basis as Judge Dennison figured lands across canal in the Chandler-Dunbar suit. He figured water front at \$550,000 and upland at \$102,312. There are no structures on the submerged land I valued. Area of made land beyond dock or meandered line is 7.5 acres.

Another sale was recently made near this; George Kemp bought from Northwestern Leather Co. 250 feet front on dock line by 600 feet deep for \$12,500, for coal dock. That is further out than this

land we are talking about-all submerged lands.

222 I put \$1,500 an acre on remainder of 46 acres, based on value of lots in adjacent additions-Chandler's, Foss and Hyde's, Scranton's, and Peninsula Land Company's subdivisions. They built a \$35,000 schoolhouse right next to D. S. S. & A. shows it is pretty good land. As to the sales in those additions which I took for a basis for my \$1,500 per acre, a lot out near Algonquin brought \$300 or \$400. Those properties are not changing hands much, as they are owned by employees of tanneries and mills. Five hundred dollars was loaned on two vacant lots in block 2 of South Shore Add.

South of the railroad track and west of Sixth St. and Fort Brady, in Foss and Hyde's second addition, are lots held for less money, but none at less than \$200; they run from \$200 to \$400. In Foss

and Hyde's Add., lot 2 in block 1 sold for \$650.

I know of no sales of unplatted lands out there; people who own those lots are not offering them for sale. Between Fort Brady and Algonquin are vacant lands in tracts of 20 and 40 acres—a garden

community. They are all holding on, same as I am.

In the country, I valued rural lands at \$25 an acre for the land, including all stations except the Soo. I made no distinction between station and country right of way; I lumped it. Some you would get for nothing, as it belongs to the Government, withdrawn for forest reserve; excluding that, some of the rest they would get at a very low price; some would be given by companies who want a road through. If you got below \$25 an acre, you generally got it for nothing. When the railroad cuts across a farmer's 40 acres, he will sell the 40 acres nearly as cheap as the right of way, for he doesn't want his farm cut in two.

223 That, and the work of negotiating with owners, is the reason I said it would cost from two to three and sometimes five times the cost of the land to get it. There are 12 acres (12.12) to the mile in a 100-foot right of way, and sometimes you spend a couple of hundred dollars to get it; that is my experience.

On December 31, 1913.

STRADLEY recalled by plaintiff.

Direct examination.

By Mr. Eldredge:

In my judgment, the value of the tract of land owned by the Sault Ste. Marie Union Depot Co. is \$198,000, which is more than I valued the same property at in previous testimony. When I testified before, I made a conservative estimate, without great care about going into the thing very thoroughly, but I stated at that time that it was way below what I considered its value, and this time I made a more careful study of it, and, it being divided up into different tracts, I had to get at it on a different basis of valuation. I was asked to estimate the value of these different tracts separately, and, in order to do so, I had to go into the subject more thoroughly, and I discovered I had made the values too low. The other time was simply by estimated front foot value; this time by actual square foot values. I considered actual sales of property adjacent.

I valued the 3.29 acre tract colored red at 55¢ a square foot. I arrived at that value by figuring actual prices paid for property adjacent. I paid \$8,500 for a part of private land claim 7, with a frontage on Magazine St. of 95.6 feet and on Emaline St. of 172.26

feet, with a total of 14,349 square feet.

Lot 2 of block 3 of Wood's Add. and a part of private land claim 7, on the corner of Ridge and Magazine Sts., and lot 8 and the east 11 feet of lot 9 of block 3 of Wood's Add., containing altogether 9,666 square feet, was purchased at \$17,000. Lots 26 to 33 of Johnson's Sub., 30,660 square feet, were sold at \$16,000. Lot 7, block 3, Wood's Add., 4,896 square feet, was sold at \$2,200; lot 5, block 3, Wood's Add., 4,800 square feet, at \$2,000; east 77 feet of lot 7, block 2, Wood's Add., 3,850 square feet, \$1,600.

The total square feet in the above tracts sold was 77,671 and the total purchase price \$47,300. I deducted buildings and improvements, \$6,000, a very liberal estimate, leaving \$41,300, or 53.2 cents a square foot. That is for property not as valuable as union depot tract, and for that reason I have made it 55¢ straight per square foot; I don't think that quite enough. I applied this 55¢ to the 3.29

acres and to the .92 acre strip on Portage Ave.

I applied 53.2¢ per square foot to the tract, 1.91 acres on Complt.'s Ex. 3a, Riggs. That is what the property on which I based my values came to; if anything, it is more valuable. The purchases I referred to are all purchases made by or through me. The tract on the corner of Emaline and Magazine Sts. has some wooden shell buildings, not worth \$1,000. I deducted \$2,000 for the buildings on lots 5 and 7, block 6. There is a little store and a house on the

corner of Magazine and Ridge Sts., and a house on lot 2, for all of which I deducted \$3,000. The most valuable building deducted was at the corner of Magazine and Ridge. The buildings are all rented for a total rent of a little over \$600 a year, which hardly pays interest,

taxes and insurance.

225 The 3.15 acres owned by the Soo Depot Co. I valued at 37.5¢ per square foot, arrived at by using these figures and others and striking a mean between the two. That is below what it ought to be, I think. I took some valuations in Scranton and Robertson's Add. into consideration. I just tried to strike a mean between that and the other property. I think the value ought to be a little higher, but I put it at 37.5¢, as that was back further.

My value for the 1.91 acres is \$44,257, and for the 3.15 acres. \$51,455. I don't think you could buy those properties at the prices if it was in private ownership. You could perhaps buy pieces of it for less, but for some you would have to pay a good deal more, so the

aggregate would be above the prices I give.

The triangle, 75 by 208 feet, Portage and Meridian, owned by plaintiff, I have valued at 25¢ a square foot, \$3,920, which is its present fair market value. I would have put it at 37.5¢, but there is a break between it and the other tract on Portage Ave.; two lots out there. took into consideration that it is in triangular shape and not as valuable as if square.

I know the tract belonging to plaintiff, 204 feet on Portage Ave., 850 feet on Meridian St. and 410 feet on Spruce St., and have valued the 3.1 acres in railroad use, No. 3, marked green on the map. I valued that at 12.5¢ a square foot, \$16,879.50.

The .12 acre (item 4, Complt.'s Ex. 1b. Riggs) and the .18 acre (part of item 9) tracts I also valued at 12.5¢ per square foot, \$653 and \$980. The rest of item 4 is .23 acre, and the rest of 9 is

226 .37 acre. If these tracts (on 3, 4 and 9, within black lines) were together, I would make the value a little higher. The basis of value that I figured from was 14.17¢ per square foot, being the sale price immediately adjacent. I took as a basis sales of lots 1 and 2, block 2 of Scranton and Robertson's Add., 7,392 square feet, at \$700, lot 25 of block 2, 3,748.5 square feet, \$357; lots 221 to 224, 10,794 square feet, \$2,060, lot 36 of block 3, 2,698.5 square feet, at \$400, and lot 8, block 3, 2,698.5 square feet, \$357. The average price of the above sales was 14.17¢ per square feet. That property is adjacent to this, and of equal value. The sales were two each, in 1910, 1912 and 1913. These were actual transactions.

I value the land in parcel 5 of Complt.'s Ex. 1b, Riggs, Chippewa County, at 6¢ per square foot, total \$16,988. Item 10 I valued at 6¢ a square foot, a total of \$21,693. In my judgment, this value was less than other property immediately joining has been selling for. I based my price on actual sales of property in Shafer's Add., and I took into account the prices of lots in Reidy's Add. The price of lots sold in Shafer's Add. amounted to 7.44¢ a square foot. Item 10 is as good property and would sell as quickly at the same price. A street

car line runs through it, and it fronts on Meridian St.

I value item 6 at 5¢ a square foot, \$53,012.50. In my judgment.

the value of that tract at present is the amount stated. If anything, my prices are all a little low. I figure the 2.5 acres at \$5,445, the 16.82 acres at \$36,633.95, and the 5.02 acres, corrected to 4.77 acres, at \$10,933.55. I did not figure the 5.23 acre tract, but would put the same value on it. I got my basis from sales of lots in South Shore

Add. These were actual sales, and averaged 5.13¢ a square foot. There were three lots sold in South Shore Add. and three in Chandler's 3rd Add., all separate, in 1910, 1911, 1912

and 1913.

I value parcel 7, Complt.'s Ex. 1b, at 4¢ a square foot, 15.06 acres. \$26,239.76, which is in my judgment its fair market value at present. This price also covers the wye in item 13. I arrived at this value from actual sales of adjacent land, three in Chandler's Third Add, and two in Foss and Hyde's Add. There were other sales at the same prices. On the other addition referred to, there were sales of other lots at the same figures.

I value item 8 at 4.25¢ a square foot, 9.57 acres, \$17,716.93. That is a little higher than the tract east, because of the settlement at Algonquin. It has the tannery and the mills, and is quite a little town. I base my price on four sales of lots in Scranton's and Foss and Hyde's Additions, in 1908, 1910 and 1912, averaging to 4.94¢ a

square foot.

All these valuations are higher than those I made of the same property on an acreage basis. I figured it out more nearly to its actual market value, and studied it a little more. If the railroad were removed, I don't know if the land could be sold right away; that would be a pretty hard proposition, but you could not buy it now for the figures I have put on it. You can't sell property until somebody wants it. I think that property, if platted and well advertised, could be sold at auction at those prices, pretty near, pretty soon, the way things are coming. I think the prices represent the fair market value of the property at the present time. I have not considered railroads at all; just the values of adjacent property, actual sales for use for buildings, residences, and other things, by people who bought to improve.

it know the value of the right of way of plaintiff from the joint yards at the Soo to Brimley. It runs right off from the high price land into unimproved land. It would average \$200 an acre for 2½ miles, to the city limits. There is platted land on both sides of it. On one side is Algonquin Sub., selling, per lot, at something about the prices given here; farther out in Hall's Add., and after that undeveloped land. There are no sales to go by. The land all along the railroad there is held in large tracts. The power company bought about 600 acres and is negotiating for more. It is right along the railroad, running out practically to the city limits. The river is close by. I own land outside the city limits which I would not sell for \$200 an acre; it is not in the market. In all my valuations, I valued the naked land, without improvements.

The value of plaintiff's right of way from the Soo limits to Brimley, exclusive of timber and improvements, is at least \$15 an acre. At Brimley, there is quite a town, and basing the value estimated from actual sales I should say the land is worth \$100 an acre through Brimley and, say, one-half mile on each side. A lot 50 by 114 sold for \$100; less than an acre on the river sold for \$400; .8 acre sold for \$135, close to railroad, nearly ¼ mile west of station; about one-third of an acre sold for \$125; two acres south of the village, not on the railroad, but over ¼ mile west of station, part of N. E./N. E. 8-46-2, sold for \$209; 1.25 acres, a little south and east, sold for \$150. These were all vacant lands. About .17 acre in section 8 sold for \$157.37, and .4 of an acre in S. E./S. E. 5-47-2 sold for \$125. Brimley is quite a nice little town. Five or six hundred people live in and around there.

229 STRADLEY.

Cross-examination.

By Mr. Wykes:

Item 1, Complt.'s Ex. 1b, was acquired by the Union Depot Co. before 1904. No comparison can be made with the prices now and the prices they paid, as the move was on the part of citizens and business men, who, to have the depot moved from Spruce St. and the freight depot further down, so it would be more convenient to the city, undertook to furnish a large percentage of the land. They formed a pool, and got special prices from some land owners. Some of the land was donated, and the railroad company paid the balance. My recollection is that the railroad company paid about \$50,000. I don't know just how much the citizens paid; I know they paid sums all the way from \$100 to \$1,500. The property is worth considerably more today than it was then. Values have advanced since then; at that time I don't think you could have bought it, without that arrangement, at the price I have fixed on it.

The sales on the corners of Emaline and Magazine Sts. and Ridge and Magazine Sts., and lot 8 and a part of lot 9 and lot 2 of block 3 and lot 7 were to myself. Lot 5 was to A. J. Clergue; lot 7, block 2, was to F. W. Clark; lots 26 to 33 of Johnson's Sub. to my wife. There have been other sales in block 3, but not recently. I have been trying to buy a little piece in block 3, 52.2 by 68.8 by 172.26, 10,451 square feet, and their price is \$10,000. There is an old house there,

not rented. I haven't cared to buy it at that price.

I have been offered the balance of lot 9, block 3, for \$2,500. It has an old building that has been burned out; not much good. None of the buildings in this block, except one, are worth much. They are cheap—no cellars, basements or foundations. I am buying the property at present for myself and others. I thought it a good buy. I have been picking it up for the last ten years, as I saw a chance. I haven't tried to force the purchases, but have bought just as cheap as I could for cash. There is no present arrangement between me and the railroad company that they shall take this property. I never had any talk with any person connected with this railroad in reference to its purchase. I had in mind, in

buying, that in time to come the new railroad that the Grand Trunk

is thinking about will come in and take this site.

There are no other sales in Johnson's Add. within 10 years of lots fronting on Emaline or Ridge Sts. I didn't look up to see if there were sales in blocks 4, 5, 6 or 7, and in Johnson's Add. I didn't go into the second block south of the railroad. I took no sales south The lots in Johnson's Add, belong to the same people of Ridge St. of whom I bought lots 26 to 33. I took sales in both blocks 2 and 3 of Scranton and Robertson's Add. I figured nothing in block 1, as the Standard Oil Co. is in block 1, next to the railroad. There was some deal to get them located by the people who owned these blocks. thinking they would make a market for the balance of their property and get a switch in there. I do not know when the Standard Oil bought that property and located there. It was since the depot grounds were obtained. Private land claim 4 has never been platted or subdivided. I do not know the price on that; it would not be as valuable as the lots to which I have been testifying.

Blocks 2 and 3 of Scranton and Robertson's Add, were all vacant lots. There are probably four or five houses now along Spruce St. They are of a character not to increase the value of the property, and up above there they have had for some time a wood yard or

231 place to unload lime, brick and building material. Those two blocks are mostly vacant. There are a few houses there, but what they are I don't know. There have been other sales, within — years, than those given, but at the same prices I gave. I took the lowest and the high prices; I took all that were different. I do not know how many there were at the highest price or at the lowest. Several lots were sold at \$357 cash. I did not go back of 1910. The subdivision has been made a good while—before the Spanish war.

The boom was in 1887 and 1888. They have had property up to boom prices right along, ever since, except where some fellow would get tired and let go. The taxes were levied on boom prices, and owners of outlying property would get tired and let go. The taxes on a ¼ interest I owned in S. W./N. E. 11-47-1 were over \$28. This property is just west of Scranton's Add., the first land not platted south of the track. The city was organized from a village, and the limits fixed, in 1887. There has never been any real effort to reduce the size of the city.

There are a few lots in Reidy's Add, where taxes are delinquent, because they are non-resident owners and they put on a heavy sewer tax three or four years ago. I had no sales in Reidy's Add. I know what lots are held at by Reidy and others, and I have two or three lots there for sale for non-residents; they hold them at higher prices

than I named here. I know of no sales at those prices.

Reidy's Shafer's and Eureka's Additions are pretty well built up. Forest Poole has been holding a vacant lot on Eureka St. for \$450, and two other lots there have been held at the same price. An expansion sewer has gone in there. Prior to 1910, I sold a lot, 50 by

232 South Shore Add. in 1910, to Julia Vogt, who borrowed \$500 on two lots, 40 by 100 feet each; I think she paid a little

more than that for the lots. There was another sale there last June, of a lot 40 by 100 feet, for \$250. There are quite a number of houses

on that plat.

I have no other sales there, back to 1910. I have a lot of other lots for sale there for \$300, and have had offers of \$250 for two lots near these that Miss Vogt bought this summer. Her lots are 9 and 10, block 2 of South Shore Add., and these other two lots were either 13 and 14 or 14 and 15 of block 2, not on the car line. My client declined the \$250, and said he wouldn't sell for less than \$300 apiece. The unplatted parcel west and south of South Shore Add. belongs to Judge Steere; that is the east half of N. E. Mr. Chandler owns the east half of N. W. lying south of the railroad. I do not know what either Chandler or Steere hold their descriptions at. Opposite their land, I figured the railroad land at 5¢ a square foot, or \$2,178 an acre.

The Soo is well supplied with platted lands at present. During the boom they platted way out in the country; one addition of 80 acres was six miles out. There are houses on Chandler's Third Add., but I don't know how many. The last sales I have there were in 1912, lots 7, block 1, 40 by 120 feet, \$225, and 2, block 2, 40 by 125 feet, \$200. I think there were others, but all the same. Chandler still owns some lots there. He might reduce the price on the entire bunch

of lots. He is not pushing the sales.

There isn't anything in the market outside of the "Y." I have no sales in Peninsular Land Co. Sub. It belongs to the Northwestern Leather Co., and built over by them for their employees; it has a schoolhouse, church and mills. The city limits are about 8 miles apart, east and west, and 3 miles north and south. The census was 13,600 people; we claim between 15,000 and

20,000, as the past three years we have been growing.

A good deal of the land south of that shown on Complt.'s Ex. 3a, Riggs, is farm land. A lot of it is platted. It is about 1¾ miles from Chandler's Sub. to the south city limits. I have some wild farm land up there that I refused \$100 an acre for. It is high ground and worth that as farming land. I think that forty which I spoke of is assessed at \$800. I have some, right across, inside the city limits, exactly the same kind of land, assessed at \$1,300 a forty, the same as they assessed the best farms with improvements. There is only one farm sale that I recollect, 40 acres four miles out, for \$3,200. The land was good, cleared, and under cultivation, and all it had on it was an old hay shed, a well, and a little old house.

Description 15, Complt.'s Ex. 1b, Riggs, runs right through land purchased by the power company, which has 600 acres there. It was bought by Clergue several years ago. I have no sales opposite this description. The land there is all wild. There are farms back up on the hill, miles away. Charles S. Beedle sold to the Dupont Powder Co. 97 acres for a powder house out of the west half of N. E./S. E. 10-47-1, about ¼ of a mile from the railroad, price \$250. It is northwest of the track, adjoining the new park and fair grounds.

A parcel of 90 acres, the S. E./N. W. and east half of S. W. 22-47-1, except the Soo Line right of way, sold for \$3,100. One corner runs

down to the railroad. It is wild land, located, where it begins to go from the railroad, up on the bluff, about ¼ of a mile from the city limits. N. E./S. E. 22-47-1 (39 acres), about 1¼ miles from the South Shore, sold for \$1,200; it is about ½ a mile from the city limits and wild land. The north half of S. W./S. E. 22-47-1, about 1¾ miles from the South Shore and about ½ mile from the Soo Line, sold for \$500. The other half of the same forty sold for the same price. All that land is rough and wild, near the edge of the bluff. The west half of S. W. 25-47-1 sold for \$4,500. It has a pretty fair barn on it and a small house. It is about 3½ miles from the South Shore and two from the Soo Line. It was cleared land. As far as the value for farming purposes is concerned, the land on the bluff is no better than that on the bottom,

which is good farming land. There are no farms along this $2\frac{1}{2}$ miles, as it has been held in large holdings ever since the boom.

I have given all the sales opposite the 21/4 miles, within the 21/4 mile limit. I do not know of any lands adjacent to the 21/2 miles of item 15 that are for sale, nor what was paid for them, nor what they hold them at. I would not give the sale to the Dupont Co. very much consideration. I simply made an estimate from the other lands that we have been valuing at the end of the city. There are sales in Hall's Add., on the N. E./S. W. 11-47-1, that I didn't take, but I used them as sort of a basis. They are \$75 and \$100 a piece It was platted at the time of the boom, and all was sold for taxes. Quite a number of the lots have been sold at those prices by owners under tax titles. Hall's Add. is about 11/4 miles inside the west city limits, about two miles from the city limits along the South That is the last plat along the line of the road. Then it runs into the water power land until you get to the city limits.

The land from the city limits to Brimley adjacent to the track is practically wild. I have not had any sales of improved farm land anywhere in there. I do not know what improved farm lands sell for in that part of the county, nor what they are held for out that way. I don't know of any being offered for sale. The S. W./S. E. 28-47-1 was sold at \$200. It is 40 acres, about a mile from the South Shore and close to the Soo Line. The sale was from a sister to a brother. The country from the city limits to Brimley for a mile on each side of the South Shore is nearly all wild land. Little corners of farms touch it. I honestly think it is worth \$25 an acre straight through. I say it is not less than \$15. I do not know whether this particular description was cleared or improved or not.

There was an old contract of the D. M. & M. R. R. Co., under which S. E./S. E. 29 was sold for \$260. The final payment was made in 1911. It was not cleared when bought, but is now partly cleared. It is now worth \$40 or \$50 an acre. It is within a few hundred feet of the railroad. My recollection is that \$400 was borrowed on the forty acres, which would indicate a value of about \$50.

In these transactions in lands which were outlying, my information as to price is usually taken from records. I wouldn't say that that was an absolutely accurate way of getting at it, because they put considerations in sometimes high and sometimes low. Sometimes they want to cover the consideration to keep from having taxes boosted. Most of them are getting to do that. When they want to sell, they might inflate it, but not often. It is not always the fact that when they want to keep away from the tax they put in a dollar and other considerations. Some of those people insist on having a consideration of some kind put in.

With reference to those sales to which I have testified, I know the character of the land and its value from the general values of the land in that neighborhood aside from the consideration mentioned

in the deed. The considerations given in deeds are very low, 236 way below what the value of the land is, as a rule. is, we have no farmers up there. Although they have lots of farms, they are generally woodsmen. Their ideas of the value of farming lands are not scientific at all. These are not the people who make the demand for the farming territory at the present time. coming in from the outside and buying fast, but not putting their papers on record. In my office, last week, five contract sales were made of lands out in the county, none along the line of the railroad. They were in different directions and at prices three or four times those along the railroad.

The land for a mile through Brimley is cleared, and is good farm \$100 an acre is quite a high price for the general territory along the railroad. At Brimley, it is right at a market. I would fix it at \$60 for the average. No, I don't think I would; you can't clear the land and get them cleared for that, and buy them at the prices they have to pay now. Lands will run from \$20 to \$50 an acre to clear. It depends, of course, on the character of the timber that was on them; some of it will clear easy and some of it hard. You have to take that into consideration, and when you get it cleared it is worth more than the cost of clearing and land, I think, because it will produce, to pay interest on that. The sales I have given at Brimley were right around the settlement.

STRADLEY.

Redirect examination.

By Mr. Eldredge:

With reference to the 21/2 miles of property within the city limits, covered by item 15, my valuation is based on the uses to which that property may be put, as well as upon prices for which portions have been sold. I did not take into account, as affecting my 237 value, the holding of the power company. I took it just as it lay there, other lands, the whole tract in there. I mentioned that as an incident that it was owned by that company. That property lies along the river and railroad. The fact that it is suitable land for sites which will have a water front is one element that might be considered, but I left that out. In the portion of the right of way between city limits and Brimley, I valued the land without timber or improvements.

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On July 17, 1912.

HENRY HOFFMAN, a witness called by Plaintiff.

Direct examination.

By Mr. Eldredge:

I am a lawyer. I have lived in St. Ignace about 30 years; dealt some in lands in St. Ignace and Mackinaw Co.; acted as agent for Northern Michigan Railroad in acquiring property in St. Ignace.

I own property and know value of lands there.

(Complt.'s Ex. 4, Riggs, shown witness.) I recognize property on map, described in Complt.'s Ex. 1, Riggs, as Humphrey lot, 136 x 1,650 feet, with riparian rights on 136 feet; present value is about \$200 per acre, judging from other sales I have made; there is good water for dock purposes there.

Value of property described in Complt.'s Ex. 1, as right of way and dock property to Martel Furnance, 6,450 feet, 9.78 acres, independent

of improvement by railway company, is \$350 per acre.

I know plaintiff's dock property at St. Ignace; should judge there was 2,400 feet harbor frontage including land occupied by docks; I

value it at \$15 to \$20 a foot-say \$20 a foot.

The Plaintiff offered \$4,000 for 160 feet of water front just northwest of its docks, but owner asked \$16,000, so sale was not made. The Northern Michigan Co. paid \$8,000 for about 950 feet of water front near Hazeltine St., extended, with some other property. The same company had arranged to buy the Jamison Lumber Co. property, which includes about 300 feet water front, for \$10,000, but deal fell

through. These properties are on shallow water, while plaintiffs property is on deep water and requires no expense for

long docks or dredging.

Adjoining railroad, where it enters St. Ignace on northwest, is a bluff 100 to 150 feet high on one side and lake on the other; in city, bluff on one side and business streets on other. I do not know of any

other entrance for railroad from that direction into city.

I know right of way from southeastern end of yards near round-house to water front, 50 to 75 feet in width. The value for any other purpose, if railroad were not there, is about \$5 per lineal foot; cost of acquiring it would be \$10 to \$12 a lineal foot for the bare land. If it was not for the right of way there, that property would be used for business lots and would be worth \$40 a front foot. All the property I have previously named, except Humphrey lot and the hotel lot, is devoted to railroad purposes.

HOPFMAN.

Cross-examination.

By Mr. Wykes:

First train passed over the line in December, 1881. Population of St. Ignace today is about 2,500; it was not over 700 or 800 then. As

to value of land along right of way, some lands are very much lower now than then; lands in the country are very much higher now than at that time. Country was just developing; before introduction of railroad it was unbroken wilderness from St. Ignace to Marquette. Allenville and Moran were unbroken forest then. St. Ignace then wasn't a village at all, settlement did not extend back from State St., except in a very few instances. The railroad right of way ran along where there were very few buildings. I think it would have cost fully as much, if not more, to acquire it then as it would 240

now, excepting damages now resulting from removal of build-

As to land from old ship dock west to gravel pit (described in direct examination as right of way from southeastern end of yards to water front), at extreme easterly end, next to State St., the right of way leaves a gore between track and street 50 to 80 feet wide, which on account of its size and shape, is absolutely valueless for any purpose whatever. If it were not for this right of way, it could be used for business purposes, and would then be worth about \$40 a foot, which amount entered into my average of \$5 a foot on the whole strip. took into consideration value given it by fact that the man owning an irregular piece next to it would probably purchase it to fill out his piece. Some portions of this right of way could be disposed of at very much more than \$5 per foot to fill out lots adjacent to right of way, but average would be \$5 per lineal foot.

Dock property of railroad, as above mentioned, 4,485 feet by the map, has only one railroad track on it. I don't think there are any railroad buildings on piece south of track; this is not shown on map.

It may be necessary, in order to construct a long dock on a curved shore, to have 3 or 4 times as much water frontage as that occupied by the dock, in order to protect dock owners' rights at outer extremity of dock; if you didn't, you would cross somebody else's land. This question has come up several times here.

I base my judgment as to value of these lands on what we had to pay for the land and other lands in locality; values are my 241 judgment. Don't know of any place in St. Ignace as well adapted to dock purposes as plaintiff's water front; farther

down you are exposed to ice floes, and farther northwest two things combine to make it far less valuable, (1) you have to go so far out to get deep water, and (2) you do not have the sea room in this bay for the big car ferries to turn around. For that reason, I couldn't say how much more valuable this property is for the purpose than that purchased by the Northern Michigan R. R. Co.

The part of St. Ignace lying between the bluff and the water front is about 400 feet at the narrowest place, the right of way there being

20 or 25 feet above water level.

Piece of land marked "e" in lead pencil on map was acquired by Northern Michigan Railroad under same contract as piece marked "e" and the water front. Paid \$8,000 for water front and lot "e" in the purchase, in order to get the water front; lot "e" (for which \$4,000 was paid) is a little bit more than "c" and had a building on it, worth about \$1,200, renting for \$7 a month.

I am D. S. S. & A. local attorney.

HOFFMAN.

Redirect examination.

By Mr. Eldredge:

I believe that part of water front, approximately 160 feet on State St., in blue color on map, between red lines, is essential to the railroad for the use of the docks which it actually has.

I have had experience in acquiring right of way for railroads; was engaged by Northern Michigan Railroad Co. to acquire its 242 right of way from St. Ignace to the Soo; I acquired a out 2/3 of it. In some instances, I presume it cost at least 5 times what we had to pay for the land in order to get the right of way; this cost was made up in traveling expenses, attorney's fees, etc., and some of the land was covered with many years' taxes. We had no condemnation proceedings. I should say that 3 times the value of the land would be a conservative estimate of the cost.

On January 3, 1914.

HENRY HOFFMAN, Recalled by Plaintiff.

Direct examination.

By Mr. Eldredge:

I testified before that the average value of the water front at St. Ignace is about \$20 a lineal foot, measured on the water's edge. I am still of that opinion. That portion of the water front in item 5, Mackinaw County, of Complt.'s Ex. 4a, Riggs, is the most valuable in St. Ignace, as it is not necessary to go very far out to get deep water, and then it is protected. Further east than the line between claims 9 and 10, the sea has a greater force on the situation, and further west, into east Moran Bay, the car ferries don't have sea room to swing around.

When I say \$20 a lineal foot on the water's edge, I estimate in that frontage, and did before, all the land between there and State St. In my judgment, all that water front is in use. The situation there is such that it would be unwise for the railroad to part with any of it; it is necessary for the proper protection and use of the wharves now in the lake. This is my opinion, as I don't suppose it is possible for any person to decide without a court decree what is and what is

not necessary for the protection of the ferry dock. It does not require a court decree to determine that it requires that room for the ferry to back around in. The decree of court comes in determining the rights of adjoining land owners as fixed by the angle from the shore line to the thread of the bay. In my opinion, it would be unsafe to dispose of any of the land. It would

also require a court decree to determine what effect a structure built

out there would have on the lumber and slip docks.

If the part of item 6 east of the red line and just west of the base of the slip dock was not owned by the company, others might build a wharf into the lake, which would make the easterly side of the lumber dock practically valueless for company uses. A wharf built midway between the lumber and slip docks and parallel with the former, might not materially interfere with its proper use, (boats could go in and back out), but what the rights of the parties would be between the lumber dock and the slip, as to extend the structure out into the water, I can't tell. Item 6, the water front, indicated in yellow, is only used in going out on this wharf—the lumber dock.

In item 3, the parcel of 1.36 acres, standing alone, would be of litthe value, but it is valuable to the city or to parties owning the land on both sides, Church to State Sts., to make a street, midway between the two streets, making a market for the land. For that purpose, in my opinion, it is worth \$700 an acre. The triangle, .63 acres, would con-

stitute just about a building lot; \$100 is a fair value.

The .72 acre, 196 ft. on State St., is worth at least \$40 a front foot on State St. for commercial purposes as there is no vacant street frontage on the south side of State St. in the market today between the wharves and Goodrow Alley. The nervew right of

way commencing on the west side of State St. diagonally from the dock slip to the north line of private claim 18 is 3,170 ft., and worth \$5 per lineal foot. In arriving at this estimate, I consider the uses that may be made of portions of it, and sales made of nearby

property.

The triangle which it crosses, 150 ft. on State St., is worth \$40 a foot front on State — for business purposes. A man who owns the land in the rear would be willing to pay that in order to make his land available for any purpose or the man who owns the triangular piece would be willing to purchase the land in the rear to make his piece avaliable for use. The triangular piece standing alone is not worth \$40 a foot. I assumed that the other land could be acquired when I fixed my price. Some portions of this right of way are not worth \$5 a foot. The piece immediately west of this, 160 ft., is, in my opinion, worth \$10 per lineal foot for the use that may be made by selling to those who own lots between it and State St., and extending their lots.

There have not been many sales of real estate in St. Ignace. Lots 7 and 8, each 40 x 90, sold this past summer for \$400 for the two, and the piece of land in the rear of lot six sold recently for \$125, or 6¢ a square foot, and a little gore back of lots 4 and 5, 1,200 square feet, sold for \$50. Another sale of a piece 50 x 100, at the corner of State St., and the alley at the foot of Portage St., was made for \$800. A lot farther west on State St. in the same block, 25 x 90, sold for \$400. The railroad right of way of 66 feet wide at \$5 per lineal foot would be a little under 8¢ a square foot. The position the right of way taxes

precludes extension of Church St. to Trucky St., and I have no doubt that the right of way for 50 feet east of Trucky would be sold to the City for much more than \$5 a lineal foot, for street

extension.

In making my figures of \$5 a lineal foot, I figured the first 150 feet from the easterly end at \$40, the next 150 feet at \$10, the next 424 feet at \$6, the next 915 feet at \$2, the next 723 feet at \$2, and the next 800 feet at \$2, making a total valuation, without the square piece of land, \$15,860. The 915 feet is a strip of land between Trucky Street and the alley. The uses which could be made of that would be for a street between those two points, on both sides of which lots could be laid out.

(Stipulated Item 8 is worth \$100 per acre, and each acre of the same value.)

I have had no experience in determining the shore area it takes to afford proper space for use of a dock. I have not had any experience as to what the man who runs the boat would find necessary. As to that particular point, I am simply applying what I regard common sense. The usual way in which the car ferry is operated is: As it backs out of the slip, it swings around to the south and gets its bearings, comes around to the north and circles around to the east, and gets on its course. I would not say the railroad would invest in very much of the shore line to permit it to do that. While undoubtedly the ferry could be operated in a way which would not require so much of a protection from structures built out from the easterly end of this railroad water front, yet it is a convenience to do that, and in order to protect its rights to enable it to do that it would be to the best

246 interests of the road to own the water front. I would not think it reasonable for the railroad to maintain a large in estment in shore land simply to permit the boat to turn around. I only mention that is one thing why it is necessary and perhaps of advantage to own that water front. Another necessary thing is to protect the proper use of the big dock south of the slip dock. In my opinion

it would be unwise to part with any of that water front.

The value I place on the narrow right of way in St. Ignace assumes its use in connection with the adjoining property, sales to adjoining owners, and the uses that may be made of it for streets. land ownerships adjacent to this right of way on both sides are pretty well cut up; it is held in many different irregular tracts. Some of this strip would sell readily and quickly for more than the figures I It would take some time to get your abstracts and to divide it among the people and make all other arrangements. I haven't deducted that from my price. This strip couldn't be sold and turned over to private owners all at once. I have never had charge of the adjustment of anything comparable with this, nor heard of anyone My value contemplates that this land may be used for other purposes than railroad right of way, for the extension of lots for streets, and for building lots. Some of it without being united with the adjacent property would not be worth much except for a railroad or for a street. In the strip as it is at the present it would not be worth much unless it could be used for railroad purposes.

247

On July 18, 1912.

EDGAR H. HOTCHKISS, a witness called by plaintiff.

Direct examination.

By Mr. Eldredge:

I have lived in St. Ignace since 1890. I am cashier of First National Bank; have dealt some in lands there and know value of same.

I know the Humphrey lot, 136 x 1,650 feet, and should say it is worth from \$150 to \$200 per acre; know right of way to Martel Furnace, about 6450 feet in length, 9.78 acres, and value it at \$300 to

\$350 an acre without improvements.

I know dock property owned by Plaintiff, 2,400 feet harbor frontage, and value it at \$20 to \$25 a foot frontage. I have special knowledge of value, because we sold property of Mackinaw Land Co. there for that purpose to Northern Michigan Railroad Co. for \$8,000; I made the sales. That was very much less valuable for dock purposes than plaintiff's dock property. In my opinion, this South Shore property is the most valuable water front in St. Ignace.

I know plaintiff's right of way from its yard, near round house, to the lake front, about 4,200 feet; it runs to the shore, excluding the Martel Furnace line. I should consider \$5 or \$6 a foot a fair price for it. It would cost \$10 a foot to acquire it by purchase or con-

demnation if railroad was not there.

I know piece of land colored green on Complt.'s Ex. 4, surrounded by red lines, upon which yard, engine house and gravel pit is located; in my judgment, its value is about \$400 or \$500 an acre. This judgment is based upon my knowledge of sale of a piece of land

marked "e" on plat, by Mr. Johnson of the Mackinaw Land

248 Co., for \$4,000.

HOTCHKISS.

Cross-examination.

By Mr. Wykes:

In fixing an average value of \$5 or \$6 a foot for right of way running 4,200 feet west from the old slip dock, I took into account that some of these parcels were cut up, and that the owners of some of adjoining property would give more than it is actually worth to get it. The person who owns the back part of a parcel would give more than the front part of it is worth to unite parcel and be on the street. If it were a single parcel of that acreage, I wouldn't put the same price on it; it would depend somewhat upon where it was located. In getting at my valuations, I placed different values upon different parts of it, and then averaged it up; for instance, the lot just north of Truckey St., with a sidetrack running through it off to the coal dock, is a valuable lot, while the lowest values are up north of Maloney St.

In arriving at my figures in the first place, before I knew anything about what this was for, I was asked what I would consider that worth per foot, and I have my estimate. That estimate was based upon my judgment; my judgment was based upon my knowledge of what property in general is held at in St. Ignace, and what in my judgment people would regard the property worth for this purpose to go through it, not putting valuations on the different parcels but just in a general way. In my judgment, if St. Ignace were without this railroad, it would be a dead town.

249 Нотснкізя.

Redirect examination.

By Mr. Eldredge:

In arriving at my final judgment of \$5 a foot, I estimated what that property would bring if the railroad were taken away from there. My judgment is that the property at the west end of this strip would be slower of sale and of less value than the east end, and I averaged the whole distance at \$5 per lineal foot.

HOTCHKISS.

Recross-examination.

By Mr. Wykes:

The values of \$40 a foot would apply to less than half of the description. I arrived at this (my judgment of value) by estimating the whole tract; I didn't take a piece of paper and put each lot down.

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On July 18, 1912.

ROSCOE C. YOUNG, a witness called by plaintiff.

Direct examination.

By Mr. Butler:

My age is 48; I live at Marquette. I am Chief Engineer of the Lake Superior & Ishpeming, and Munising, Marquette & Southeastern Railway Companies, which have headquarters at Marquette.

These companies haul ore from the iron district.

I began working at civil engineering in June, 1883, as a rodman. I worked from 1883 to 1893, except one year, on the Peninsula Division of C. & N. W., headquarters at Escanaba. From 1893 to 1894, I located for the C. & N. W. in Wisconsin. During 1894, I had charge of a water works plant in Illinois. From 1895 to 1900, I was Chief Engineer, and Chief Engineer and Superintendent, of the Munising Railway, now a part of this system.

During 1900. I worked with the so-called Cooley appraisal, appraising the railroads of Michigan. I had the South Shore, Mar-

quette to the Soo and St. Ignace, the Munising, the Manistique & Lake Superior, and the Manistique Railways, part of the Pere Marquette, from Port Huron north and west, and the Michigan Central, Saginaw to Kalamazoo, via Jackson; also special work at other places. After that appraisal, I worked for the Copper Range, on special work, for two or three months. From the spring of 1901 to 1903, I was Chief Engineer of the Des Moines, Iowa Falls & Northern, in Iowa; and located and built 76 miles. During the next year, I was locating engineer of the Rock Island System, and located 200 miles through Illinois. I came to this road, here in Marquette, in June, 1904, and I have been here since.

Since here, I have located and acquired right of way for and built some railroad; we build some every year. 251 year, we built ten miles at our east branch, and the next year, I built 25 miles-our Lake Independence extension. The next year, I built from Little Lake west and the mining tracks around Prince-Since that time, we built our north main line through Negaunee, and I had charge of the construction of the South Shore change through Negaunee, where they built the new track. tended our line from Ishpeming west to the Barnes mine, about seven and a half miles, in 1910 and 1911. Except about five years, I have been railroading in the Upper Peninsula 29 years.

When I took part in making the examination, for the Cooley appraisal, of the lines of the South Shore Co. east of Marquette, I went over the road on a handcar. I made and reported estimates of the quantities of grading, and classification as between earth and loose rock and solid rock.

Two weeks ago, I went over the lines of D. S. S. & A. west of Marquette, as far as Iron River, Wis., going over all main track in Michigan west of Marquette. I had with me the condensed profile. It gets to be a habit to form opinions as to the yardage in the roads; that is a part of the engineering profession. We are required, in locating, to make approximate estimates of yardage per mile; we get familiar, by looking at a piece of road and profile, with arriving at the approximate quantities. In calculating the yardage to be moved in a railroad to be constructed, the profile is used. It is customary to add percentages and other things deemed necessary to bring the yardage up to what we think it actually will be to include work outside of that actually shown on profile.

252 It is customary to add 10% to cover shrinkage and settlement; it is also customary to add a percentage, and a percentage must be added to cover grading for crossings, channels, surface ditches, drains, roads to barrow pits, etc. An engineer usually forms an established custom, though he departs from it if there is anything Usually, I add 10% for these things, and if there is extraordinary. a lot of swampy ground, or something like that, we add more; this percentage is in addition to that for shinkage and settlement.

On D. S. S. & A., east of Marquette, I would add 10% for shrinkage and 10% for highway crossings and extras, except through the long swamp, Ta-qua-me-non, where it would be necessary to add at least 50%; my recollection is there is 30 miles of it. My experience justifies 10% for shrinkage and settlement; it is only a safe figure to bring the road to completion at the end of contract period. Even that would not cover the road after operation for a number of years.

Ballasting in swampy places disappears. On Munising railway north of Shingleton, I put three train loads of sand ballast on a similar dump to the one spoken of and two years later hauled two more train loads on to the same embankment; the sand had settled into The surface of the embankment on which the ballast rests sometimes settles and distorts out of shape, requiring more and more ballast, as time goes on, to keep the line in shape for operation.

American Railway Engineer and Maintenance of Way Associations' Report, pages 548 to 552 inclusive, for 1907, shows cross-section cut of an established roadway; it indicates a deformation of

the original roadway, and that there is 2 or 3 times as much 253 ballast actually in roadway bank as indicated on surface. is always the case, and more especially in soft roadway; clay roadway is not as liable to deformation as the muck banks I referred to on D. S. S. & A.

The illustration shows how it is necessary to keep restoring the ballast from time to time, and that it is impossible from examination or measurement of a bank to calculate accurately the yardage of grading and ballasting of an existing property. The presence of that amount of ballast is an advantage to the track; the track becomes firmer after the period of years shown. A railroad embankment well maintained appreciates; the reason is that when the road is built it settles and it is necessary to employ a larger number of section men to keep track in good operating shape, and the shoulders of an embankment wash down, and it is necessary to haul more material on for shoulders, until banks and cuts are grown over with vegetation, so they stay practically the same.

Growth of vegetation on slopes adds to value of the property; it gets in fair shape in 5 or 6 years; after 10 years it is practically permanent, after which it usually requires no more work. M. & S. E., Marquette to Lawson, 10 years old, I was obliged last year to widen all of the shoulders, to get in shape to hold ballast; on that track, though 10 years old, the cuts have not become sodded over like D. S. S. & A. Construction, or added maintenance, continues a number of years after the road is open to use; it is necessary to keep doing work on it a number of years, which is not usually considered in line

of maintenance work.

For 1911 or 1912, in my opinion, fair unit price for grading to reconstruct lines of D. S. S. & A., taking everything 254 into consideration, would be 30¢ for earth. You would have

to pay contractors the price for that length of line.

For ties, as a whole, I always figure 55% condition as their limit. After the road gets to a renewal basis, the ties are usually 55%; they are still in 100% efficiency. If ties last 10 years, 10% must be substituted by new ties each year. When the old tie is taken out there is a new one to put in its place; you have them both on hand, which

is the reason it is 55% instead of 50%. You are using the old tie, but still have the new one which has been charged to the work.

Usually 3,000 ties per mile of main line are put in first class track; South Shore main line and mine tracks have 3,000. A cedar tie will last 12 to 15 years; hemlock or tamarack 6 to 8 years. We have been putting date nails in our ties for 12 years; have kept a record of every tie that has come out, and had that compiled, so we know how long they last. In 3 or 4 years we make a statement of averages; that is done so we know what ties to buy.

Last year we paid 38¢ for cedar ties along the track; it costs us 2¢ to load on cars, and we figure inspection at 1¢; I should say on the South Shore 3¢ a tie would be the minimum for freight charges, 2¢ for loading and unloading, and 1¢ for inspection; that would make

It costs probably half a cent more apiece to load hemlock and tamarack ties, as they are heavier. 38¢ is the price we pay small jobbers, delivered alongside our tracks. Ties sold for more money last year

by the larger shippers; we buy ties considerably cheaper to 255 take them from farmers and the like along the track. are dealers along the Munising Railroad that we cannot buy ties of, as they get more for their ties in Chicago then we can afford to pay. It costs more to load ties picked up along the main track, as we must have the services of a tie train all the time. The hemlock, tamarack and black ash ties would be a half cent more for the extras and the tie charge is 30¢, making 36.5¢. For culls or number two ties, I paid, last year and this: cedar 22¢, and hemlock 18¢; loading and transportation, 6¢ extra. This is ties taken on regular inspection; taken out of regular inspection, we paid: cedar, 15¢ and hemlock 10¢. Material is getting scarcer and harder to get. The high prices of two years ago have not been reached since, but we do not get the low price we did 10 years ago; the tendency is upward.

I estimate track laying at \$528 a mile. I am generally low; it generally costs a little more than I estimate. There are other contingencies and things which make it cost more. I think it usually

costs 20% more than my estimate.

It is customary to add for engineering services in constructing a The recognized percentage varies somewhat; my experience is that 4% is about right, applied to the construction items, not

including rolling stock.

It is necessary to allow interest during construction, the allowance depending on the time and rate; the time is an estimated factor. To reconstruct plaintiff's lines, including location and acquiring right of way, would take about 4 years; the location ought to be made in 256

a year. The chances are, the right of way would not all be acquired until construction was completed. I think a year

for preliminary and three years for construction.

The bulk of right of way would usually be paid for before grading is commenced. The interest should be computed for half the time for construction-2 years. Our custom is one-half the period at the full rate; I think that about right. 5% is customary, and our calculations are based on 5%. The rate depends on the credit of the

owner. I am always instructed by the management what rate to

figure.

Our company has good credit and strong associations. I think its credit the best. The Lake Shore & Ishpeming are now building an ore dock near Presque Isle. I estimated the interest at 6%. They told us that conditions are different, and the bond rate would be higher. It is now on the second year, and I have over-run almost 25% on it. My interest estimate was \$36,614; on June 1st, we had spent \$42,030. We won't begin partial operation until Aug. 1st, 1913. My experience is, if you get any earnings due to operation during construction, they hardly come up to cost of operations. Such operation is a nuisance; it interferes with construction, and makes it cost more. My opinion is there would be no net revenue during construction to be offset against interest.

While I think the road when built, Soo to Marquette, could be operated at a profit while the rest was being constructed, I don't think they would finish a piece of road like that; they would not get it done in three years if they did. They would have to start it all at the same time; if they started to build from here to the Soo, and did not start the other work, it would take more than that time to build

it. Piecemeal construction would take more time and money.

In estimates of cost of railroad construction, it is customary to include, over and above all items of material and labor that can be specifically enumerated, a percentage for contingencies. So far as my experience goes, 10% is customary for all construction items until the ballasting is finished. I am not as familiar with rolling stock, and do not think the percentage as high. On 5 engines recently bought, the overhead cost, including freight, inspection, etc., was 3%.

My custom is to add to all the different items going to make up the estimate, usually, 10% for contingencies, and afterward I add another 10% for contingencies to the whole estimate; we always needed it before we got through. I always figure that if I come within 10%, one way or the other, I am near enough. I sometimes overrun 10% and sometimes underrun 10%, but have concluded that that is a fair method. If I understand correctly, Mr. Riggs'

percentage for contingencies in Complt.'s Ex. 1, Riggs, page 292, includes a percentage for engineering.

I don't think the average of 7.9% high enough for contingencies. On some items, such as ties and track fastenings, 5% is allowed; I do not think the average is high enough. It ought to be 10% on both ties and track fastenings. I do not see anything else on page 292 but what looks all right. The right of way items might be a little low; it is hard to estimate. I have never been able to make an estimate on that.

The estimates and experience referred to in my testimony relate principally to work on the L. S. & I., M. & S. E. and Munising Railroads, about 160 miles of main track and 50% other track. The prices have been varying, usually advancing. I have had to do with acquiring right of way, involving acquisition through

258 rural, timber, second growth and agricultural lands, in northern Michigan and Iowa.

I am familiar with lands through which South Shore runs. I am able to give my opinion of relation of cost per acre of right of way lands as compared with value for other purposes in rural districts; eliminating mineral lands, the average relation is 3 to 1. You get extremes both ways; sometimes you pay about the actual land value, and again, somebody holds you up to more than 3 times the value. On a piece of land 25 miles northwest of Marquette, acquired 7 years ago, prices, aside from cost of procuring, ran \$15 to \$170 per acre, through practically the same kind of land. That land varied from sandy loam to heavy soil. The timber conditions were about the same as on South Shore, some second growth, virgin timber and rocky lands.

On recent trip over South Shore, I noted character of land in Gogebic, Ontonagon, Houghton and Baraga Counties. I have never been able to buy right of way at less than 3 times what I considered

the fair value of the land.

In my opinion the multiplier to be applied to market value of land, Nestoria to State line, is at least 3. That applies generally, People I have had to deal with objected strenuously to a railroad across their property. This would apply to all the lands of the company west of Marquette. I have a good deal of experience in getting right of way in Marquette County.

I do not think you would be able to buy any land without mineral The principal area containing deposits of iron is from reservation.

west boundary of Marquette County to near Eagle Mills, 8 259 miles west. Prospecting there to Marquette has never shown anything. In past few years we are not able to get right of way in Upper Peninsula without mineral reservations and removal clauses that read "by removal at railroad's expense if minerals are found under tracks." We have to accept that kind of grants. cannot afford to pay for suspicion of mineral under right of way. The tracks of my company, the South Shore and the C. & N. W. are

indicated on Complt.'s Ex. 8, Riggs.

I have recently procured right of way in territory embraced in this map, in section 5-47-26; this was for South Shore, where I had charge of construction. I procured three-quarters of a mile to a mile of the 2.6 miles right of way now used by South Shore. I acquired this right of way and built for plaintiff, as Cleveland Cliff Iron Co., which controls L. S. & I., owns mines each side of old South Shore main line. The South Shore had permanent right of maintenance contract on their old line, which could not be enjoyed consistently with the mining under the track and for some distance As they mine the ore, they hold up the surface temporarily; when they are through mining that part of the mine, they let the surface cave in. It would be too expensive to reconstruct the track afterwards, and you cannot tell when it is liable to cave.

The owners of the surface do not think it best to mine the ore and hold up the surface; that would be prohibitive of the mining. About a mile and three-quarters of the South Shore was abandoned,

and in locating a substitute road 2.6 miles was built. The new location is not subject to removal clause; the Cleveland Cliffs gave a bond to certain land owners for any iron ore that might be tied up on account of construction of the new road.

The mining, even if not under the right of way, is likely 260 to disturb the railroad. They figure a slope of about 60 degrees, 1,000 feet depth, is liable to pull 700 feet, and 500 feet to pull

400 feet away.

The right of way I procured, about 15 acres, cost \$5,000 an acre The Cleveland Cliffs employed the L. S. in addition to the bond. & I. to construct this line, and owned an interest in the company which owned part of the right of way; the price was made by other interests. I think \$5,000 was too much, but we were not able to get it for any less.

The cost of construction of a single track of the new road was a little over \$80,000, and the right of way about \$102,000. The Cleveland Cliffs and Oliver Iron Companies paid the cost. It was necessary to build more line than the abandoned right of way in miles; the line is not less than 100 feet wide—a little more, part of

The price for the right of way throughout would be about \$3,500 per acre. Only a portion of the abandoned right of way was underlayed with ore. More ore is tied up than is under the 100 feet. might be 500 to 700 feet each side of the track. We also built, in 1911, a track to Negaunce Mine, nearly parallel to and north of the above track, across sections 5 and 32; it is marked L. S. & I. Railway. The deed has usual removal clause.

I procured right of way to Negaunee Mine, number 3 shaft, through section 33, S. E. 1/4 of section 32-48-26; and N. W. 1/4 of section 5-47-26, in 1911. Right of way across N. W. corner of sec-

tion 5, from Pioneer and Arctic Mining company surface rights with removal clauses, cost \$1,350 an acre; we condemned the S. 1/2 of S. E. 1/4 of section 32, and N. W. 1/4 of 261S. W. 1/4 of section 33, getting the same rights as by deed-removal

clause and waiver of mineral rights.

The N. W. 1/4 of S. W. 1/4 of section 33 cost \$1,111 an acre, not The other parcel, with three owners, cost \$3,059 an acre, being .85 of an acre at \$2,600, .21 of an acre at \$2,381 per acre, and .64 of an acre at \$2,344 per acre; it cost \$1,100 to \$3,000 per acre for right of way subject to removal clause.

know that land would no: sell for \$1,000 an acre if platted.

I am familiar with right of way of South Shore, mile posts 163 to 164 plus. It is practically the same as east end of new line; it crosses same parcel as this \$1,111 an acre piece that I have in here. Except for permanency of right of way, the cost of right of way of new line and for line to Negaunee mine would be about equal. The question of permanency or existence of removal clause bears substantially on cost, because nobody knows whether there is any ore there or not.

Am familiar with south line, mile posts 9 to 12; it would average about the same as new. The west end of the south line is right in among the mines. Do not think right of way quite as valuable on

south line as on north line.

We bought another little piece on section 7-47-26, with right to maintain one track for about a quarter of a mile, 1.10 acres, in 1909 or 1910, and paid \$5,700 an acre, to build a track to another mine. The \$700 was to a tenant for moving a building back. We had removal clause. The South Shore goes right alongside this.

Conditions are the same three-quarters of the way through section 18 to within a quarter of a mile of the south line;

that is the Palmer or Volunteer branch.

It would be impossible to get perpetual rights at any reasonable expense. In my opinion, you could not procure right of way of Palmer branch with right to perpetually maintain track except by condemnation proceedings. The only thing I have to guide me as to the cost is what was done around Negaunee; I think it would cort \$2,000 an acre with the removal clause.

I think fair cost to reproduce Palmer branch right of way subject to track removal \$2,000 per acre. I do not think any sane man would go in there and estimate it at that unless he had had some experience in it. Don't think right of way to Mary Charlotte mine, 3.2 acres, would cost quite as much; not more than 40% or 50%—about

\$2,000 an acre.

I have procured right of way through west end of Negaunee from center of S. W. ¼ of section 31-48-26, down through section 1-47-27, connection with L. S. & I. old main line in S. E. ¼ of section 2, in 1909. It is heavy work, and width is more than 25 feet average. We have 50 feet all the way except part of section 31; on the S. W. ¼ of S. W. ¼ of section 31, and N. W. ¼ of N. W. ¼ of section 6, we have 400 feet; we bought it as lots. Where we bought unplatted part in section 1 by the acre, we paid \$1,000 an acre. It belonged to same people our road belonged to. Right of way bought at that time contains 4,603 feet of track to west line of section 1, and cost \$45,-288.45, making \$9.84 a foot.

Another description, of 1.73 acres, cost \$7,000, or \$4,080 an acre.

Adding that 760 feet, would make 5,363 feet, at \$9.80 a foot.

The 760 feet of 1.73 acres was acquired by condemnation, and took entire surface; the owner did not own the minerals.

There is some question whether it included any right to sustain the surface. Owner was Samuel Collins, and description the W. ¼ of S. W. ¼ of S. W. ¼ of section 31-48-26. I think they got too much. They claim value to be there on account of platting purposes. You would be surprised if you could see the prices that we had to pay for lets there.

for lots there; I would not have believed it myself.

The value of that parcel, as compared with reproduction cost of right of way of South Shore through Negaunee, is a good deal less. You could not buy right of way through where South Shore Negaunee station is. The parcel above described cost \$9.80 per foot for trackage rights. Strategically, South Shore is in a great deal better position than this new line; it is right in the center of the business part of town, and this is on the outskirts. It cost us \$258,000 to

build that piece of track through there that we would not have been obliged to pay had we had a perpetual right of way on other line.

I have acquired other right of way through this same point, or through between Ishpeming and Negaunee from west side of the platted portion of Negaunee to west city limits; we got just width enough to lay our track, at \$1.55 a running foot, for 3,305 feet. There is removal obligation there.

Comparing rights described with those of South Shore, alongside, I feel hardly competent to make comparison; we are only tenants at will. Width occupied by South Shore is in some places greater than ours, and would average 1½ as much. For north track, my

264 experience in procuring this last job of right of way would be a fair guide to fair cost of reproduction, except their rights

are a little better than ours.

We made 2 or 3 condemnations in Ishpeming, and all looked ridiculous to me. There is a little house on a triangular lot where we crossed South Shore track; we took off a triangular piece of the lot, about 50 feet on one side and 40 on the other, which did not involve any difference in the lot, and question of the proximity of railroad did not cut any figure, because South Shore ran right behind the land. The introduced her \$2.000 for cutting off point of that lot.

jury allowed her \$2,000 for cutting off point of that lot.

Another place in Ishpeming, where Pine St. crosses L. S. & I., we acquired a license, subject to redemption if needed for mining purposes, of 1.15 acres, for building track, costing \$787.58; re removed rock, at cost of \$1,181.50, and in addition moved a lot of houses and things which cost us, with the removal of a city water main and the building of another street, probably \$2,500.

I procured right of way for extension to North Lake mine, 4.3 miles. We paid owners a thousand an acre for surface rights and tenants \$50 an acre for theirs, from west line of section 10, in Ishpeming, to city limits. Tenants had cleared ground and had it under cultivation. From that point to North Lake, Excelsior Iron Co. owned all but one description. We paid tenants from \$48 to \$75 an acre for their clearing and cultivation, and \$100 an acre to the owners, plus attorney's fees.

On one piece, in section 5, to get 3 acres we were obliged to take 5, for which we paid \$1,000. We were building to the Excelsior Mining Co., and \$1,000 an acre was paid to it for its lands; that company is owned by Cleveland Cliffs, which owns

a majority interest of L. S. & I.; 60% ownership of railroad company and mines were identical. The president of the L. S. & I. is president of Cleveland Cliffs and has quite a voice in the matter in both cases. His contention is that their company should get what other people get and accept for their rights.

We have been able to get right of way from Cleveland Cliffs at a little less in every case than through outsiders; think it is all too high, but we cannot get it cheaper. For comparison, we paid the Cleveland Cliffs \$1,000 an acre for the N. E. ¼ of N. E. ¼ of section 1, and in condemnation \$4,080 an acre to an outsider for parcel in S. W. ¼ of section 31. Cleveland Cliffs parcel was nearest to town and worth more per acre. I offered Collins \$1,000 an acre, rather

than go into condemnation. Conditions in Ishpeming and Negaunee are just as good today for getting right of way as they ever will be, and I think better.

If railroad was out of there, and that 25 feet owned by those who owned the abutting lands, there would be an element of damages on account of injury to property and lands not taken. It would cost \$50 to \$75 a running foot to get that right of way through there, perhaps more; I mean that is just the value of the property. If lots and blocks covered land now occupied by South Shore, chances are you would have to pay damages amounting to another \$50.

By reference to Complt.'s Ex. 6, Riggs, (Marquette) lot 1 was a:quired by condemnation, for freight house grounds, on Lake Street. There is 500 feet on Lake St. at foot of bluff, below Ridge street; it

runs back 145 to 163 feet, contains 1.7 acres and cost \$14,10). 266 It had no water rights; was part on hillside,, with 6 owners. Probably half of it was useful. There were 3 or 4 houses,

which we gave away for tearing them down.

We bought the site of our present depot, corner Washington and Lake Sts. in Marquette, 4 years ago, 2.34 acres; .67 of an acre on hillside, and 1.57 acres good ground. We paid \$50,000, and worked over the old shells of buildings into our offices. We called the buildings

worth \$25,000 and the land \$25,000.

A couple of years ago, we paid for trackage rights near Hampton There was a lot 40 feet front on Lake St.; we paid \$250 for abutting damages for building on opposite side of street. Ten years ago, we bought lot 1 in Edwards' Add., between Garden and Mesnard Sts., 200 feet by 446 one side and 504 the other. It had an old stone house of no particular use on it, and cost \$8,500 plus some taxes. By the Chocolay River, 300 or 400 feet from South Shore road, we paid \$1,000 for .9 of an acre, for right of way. There was a house on the front part of lot.

267 YOUNG.

Cross-examination.

By Mr. Wykes:

I was connected with 1900 Michigan appraisal, and testified in 1902 appraisal. For 1900 appraisal, I made inspection of railroads in both Upper and Lower Peninsulas to determine grading, ballasting, etc., going over the road on a hand car, making 35 to 50 miles a day, except where there were a lot of buildings, bridges or sidings.

The recent inspection of D. S. S. & A. was from back end of a private car on special train. We spent two days on the line west of Train was moving most of the time; we stopped and examined a few bridges and a few buildings, but did not stop to examine quantities of earth work. From character of inspection, there would be liable to be some variation from figures obtained for quantities of earth work. Nobody can look over a piece of road and absolutely assert that there are so many yards, and no more or less. I considered judgment I gave conservative. It may not be absolutely correct. Without measurements of cuts, fills, slope3 and heights, it is a guess. The best way is to estimate from the profile and add proper percentages; I didn't attempt to make an estimate, except to give judgment on an estimate I made for the purpose of checking. On an inspection of the character I made, there might be a variation of 20% to 30% on the actual yardage. Same thing would not apply to the rock. I am satisfied that this would be much more than the figures I gave. I would not be surprised if there was three times as much. The variation of my figures from actual solid rock might be from 20% to 40%. I think variation would be over; I don't think there could be any variation under.

Shrinkage is the earth moved necessary to put into a fill over what you can measure in a cut. It is always necessary to put more earth in an embankment than you can find in the cut. An

engineer putting shrinkage on embankment always sets his grade stakes a certain percentage higher than his actual grade. You cannot set your grade stakes 10% above grade you want, because it might not shrink that 10% before you got ready to lay track. You have got to take care of shrinkage sometimes in extra widths—putting it on the side of the embankment. To each original estimate of yardage, after estimating profile as near as I can, I add 10% to all quantities, to take care of shrinkage and embankments, the extra yardage and cuts due to the side hill slopes and surface ditches and such things. Measurement and payment for earth quantities is on earth in place in the cut, which is packed earth.

The contractor is paid a place measurement on excavation. In making estimates from the profile, the fill embankment nearly always overruns the excavation. In order to get whole estimate you must take embankment estimate for your figures, or cross-section all cuts before you make your estimate; therefore, figures you get estimating your profile are embankment rather than excavation figures. You add the 10% to take care of excavation figures, such as contractor is paid upon. Figuring for purposes of payment, you figure directly upon cut, while, figuring for purposes of appraisal, you figure on the fills. If the cut happens to exceed the fills, then the cut estimate would be taken, rather than the fill. It gets back to the question of whether, in estimating the profiles, estimate was made on the fill quantities or on the cuts.

Overhaul is the distance beyond free hauls; the contractor, for a stipulated price, agrees to haul material for 500 feet; for every hundred feet past that he gets a certain price per hundred feet for hauling. In this territory, 500 to 1,000 feet is the free haul. It depends on character of work and kind of equipment: if done

with wheel scrapers, we usually make the free haul 500 feet.

If better to use tram cars and track, then it is 1,000 feet.

The 30¢ price would cover either 500 or 1,000 feet. For overhaul, the usual price is 1½¢ per 100 feet per yard. I have known it to be 2¢, and to be 1¢. I have known, and let, quite a number of small contracts at 1¢. In making an appraisal, if you are going to get at cost of the property, overhaul is to be put in. I would not include

that item in contingencies; it is not difficult to get at, if you have the profile to work from. When the contractor is paid, you have actual, instead of estimated quantities. If you had sufficient data to get at price of overhaul in any other way, it should not be included in contingencies.

Contingencies is to cover those things you cannot get at. question of whether things of that kind were or were not included in contingencies would affect rate that should be added for them.

In the place near Taquamenon swamp which I described, speaking of filling and putting on extra trains of sand, I would not put it under contingencies; I would add that percentage to earth work when I was making the estimate. If I found that profiles show 5,000 yards to the mile, in making my premilinary estimate, I would say that it would take 10,000 yards, if I knew that swamp was there; and I would know, because we always know what kind of land we are going over. I suppose for inspection of completed road it might come into contingencies, but it would have to be a larger contingency than we have ever used to cover it. I do not think that it ought to go into the contingency. An engineer with judgment enough to know would cover it in its yardage by a percentage, in the first place. The company's records might show the yardage

now, but would not in the old days.

I intended to add a percentage for shrinkage, and then another percentage covering what I mentioned in the way of ditches, road crossings, etc., that are not usually taken in. I did not add any more percentages, but said that in the case of a large swamp 10% wouldn't be nearly enough; it would there take nearer 50% for shrinkage, which I would add as a percentage to the quantities. That applies to a swamp. A sink hole is a depression grown over with vegetation. The weight breaks through this crust and you must fill in the hole. The amounts required for sink holes would have to be included in the estimate, which would be difficult.

My experience is that, after you have gotten at everything as best you can, then you must add a percentage for contingencies to take

care of things you cannot find.

A surface ditch is sometimes placed on the edge of the right of way, to keep the water from coming into the cut, or seeping through the sides; it drains the top of the cut, and is put in, either at the time of original construction or afterwards, by section men, when Crossing fills are made for all existing crossings at time of construction, before the road is turned over by the contractor.

The first two or three years the roadbed is settling, and the work done on it goes into permanent construction and becomes an asset to the road itself. You must have extra section men during this time, as well as extra work trains and extra work in the engineering departments. On our road, if we can do this work with regular section men, we charge it to operation, otherwise to capital. Section labor always goes into operation. Our road and the Northwestern generally make authorizations and put on extra trains and gangs to do this work. It is then charged to capital.

I am not sure that all railroads charge the work in parts of roadbed during first few years which I stated was construction rather than maintenance, to capital; as long as it goes to betterment of railroad, it is an asset and an added value to the road, whether charged to capital or maintenance. In my experience, a road, if properly kept up, becomes easier and less expensive to maintain with age.

In one case, where we purchased 5 locomotives, shop inspection and freight amounted to 2%, charged to the locomotives; when a new locomotive took the place of these, there would be a new engineer-

ing charge on the new locomotives.

South Shore uses a 7 inch standard tie; ours is a 6 inch. We paid 38¢ alongside our track for 6 inch standard cedar ties. We do not want to buy any, so we put our price very low; 23¢ on hemlock and tamarack, to 19¢ for culls, is the price posted for 1912. Last year, I paid 30¢ for hemlock, and the same for cedar. I bought tamarack or hemlock ties, that seller would rather we would take than bother with shipment of less than car load, at 23¢; a few they could not get rid of any other way. We paid 37¢ for hemlock and 47¢ for cedar, to Northwestern, where we have joint maintenance on tracks, or in exchange of tracks, and charged the same price to them; then they charge 15% for freight, counting and handling.

I figured my ties at 55% of their value new, where renewals are sufficient to keep up the depreciation within the life of the tie, where in normal state of preservation. I figured there is one tie in the track good for a year and one practically new; you average a tie that is good for one year and tie that is good for 10 years, and it will give you 5½, or 55%. I figured there is no tie in the track not good for

a year. We always have a factor of safety on ties, the new tie is on the ground and has been charged to the track, or if you take it after it is in, the last tie is good for 10 years and the first one good for one, making an average of 55% in either case. That is when track is in normal condition and ties are running to their limit; if the life of the tie were 9 years and renewals on the basis of 11, they would be run two years beyond their safety point, and they would not be at 50%. The fact that the average life of a tie might be 9 years and you left it in the track 11 years would not mean that they were two years beyond safety point, because there is a very great variation in the life of ties; some will last double what another of the same kind will.

The average life of a cedar tie is 12 years, but some will last 25, and some must be taken out in 7; average life of hemlock and tamarack is 6 to 8. I would not say it was possible for condition of ties, in a main track being used, to go below 50% with safety. Ties with average life of 9 years might in a certain piece of track run 11; it depends on nature of soil. We take them out on inspection. On a straight line, you can allow a tie to run a little longer than on a curve. Section foreman makes his inspection, by going over with a pick, testing ties to see whether rotten, and estimates number of ties to be put in, after which roadmaster goes over and checks him up; road master walks over the road, usually, or goes on a hand car where he can see it, but that is only to get at the estimate of ties needed that

Sometimes a road would stand 2 years without ties: I have seen that done without renewals, when they think they are keeping it

up in normal state.

I do not remember just what my grading price on South Shore cutoff figured out at; I don't remember that I ever figured it. My estimate was 30¢ and it ran very close to that. I don't think I ever furnished South Shore or Mr. Riggs with actual yardage; Mr. Riggs' approximation was estimated yardage. I might have furnished correct tally, but do not think so; I furnished a profile with

274 estimated yardage on it to South Shore. The total cost included everything, including rock, that went to make the expense of the work. I don't remember that rock was separated from the other work in my preliminary estimate; my 30¢ did not cover rock work. I had two contractors figure on that work before it was done, and one made a price of 27¢ or 28¢ and another of 33¢. don't know what accounted for the difference between them; the higher one was a little afraid of the sink hole, and the other man's

outfit was a little closer by.

In past few years, our company has done grading at less than 30¢; on the short spur west of Ishpeming we let part of it by contract to a small contractor for 24¢. We did the heavy part of it ourselves, that being a steam shovel job, and a long-haul-about a half milefor 30¢; it was all fill, to build an overhead crossing in Ishpeming. The question of overhaul not so material in steam shovel work; on South Shore cutoff, nearly all the work would have been more than the earth price due to overhaul. So that method-paymen for overhaul-would have cost more than 60¢, instead of 30¢. If material were there to borrow, it would be impossible for an overhaul charge which reached or went beyond the contract price for moving earth, due to fact that when overhaul becomes too great you borrow from other pits.

On a careful inventory, it is impossible to see and get everything. The percentage for contingencies should not be below 10; unless proper care is used, more than that is probably needed. Contingencies is for items not anticipated in construction. After road is completed, some of those items have become visible, and are capable of inventory, but the larger part of them are not; if I were able to sit here and list the items, they would not be contingencies. The theory of the contingency is that the items are there and have to be paid

for.

275 Lowest price we paid for right of way in Ishpeming and Negaunee district was, Ishpeming to North Lake, \$100 an acre for right of way and \$50 for settlement with tenants; that is west to our North Lake mines.

Young.

Redirect examination.

By Mr. Butler:

A comparatively high proportion of South Shore mileage in Michigan is tangent or straight line. The high rail on the curve wears off on the guage side only; very little wear is on the top of the ball of the rail. The inner rail wears on the top only. (The witness produced a chart—Complt.'s Ex. 18, Young—showing the different way- rail would wear in different places.) On a tangent, with the same amount of service, rails would show very little wear. The outer rail of a curve is worn off much more than the inner. The outer rail is worn on guage side, in some cases, enough to make it necessary to remove it. The outside rail on a curve may be placed on inside, and inside rail on outside; when so transferred, the rail does not wear as rapidly as a new one would in the same place, but will last as long, or longer, on account of its having been cold rolled with the traffic.

Rail removal from main line track or curve is excellent for less important lines, putting the unworn side toward the guage side, and

the worn side out.

Young.

Recross-examination.

By Mr. Wykes:

My testimony with regard to rail wear and use of rail on curves is dependent partially on study of experience on B. & O., though I recently made some study on it myself and calipered 276 some rails. The traffic on the L. S. & I. is very heavy in Our rail wear is heavy on curves, but not on straight line; we have about 50% of curves, which is a high percentage. traffic is ore, in full trains when they can get it; very often they run with light trains. I am not able to tell what one train does wear the track, and it would be impossible to know what wear is due to one character of traffic, and what to the other. Weight and character of the cars, and whether curve is on grade or level track, are factors. The curves wear more rapidly than the tangents; that a curve occurs on a grade makes no difference in wear, but it does in the resistance to pulling power of locomotive. I don't think a locomotive drawing a heavy train wears the track more than a light one; it is the engine that wears the rail, more than the cars. The power of the train comes from contact of engine wheels with top of rail, and not with the guage side of the rail, which does not wear unless the engine slips.

Wear of rail or fastenings, or depreciation of ties due to derailments, is a considerable item during construction; I mention it as a contingency of construction. It would also exist more or less in operation. There would be less derailment of passenger trains than of freight, on account of the greater care in inspection. I did not notice any rail on curve on South Shore, on inspection trip, that

was worn very badly.

On January 7, 1914.

Young, recalled by Plaintiff.

Direct examination.

By Mr. Eldredge:

I know the south yard of the South Shore in Marquette, and have seen Complt.'s Ex. 1c, Riggs, Parcels 6, 7, 11 and part each of 12, 13, 14, and 16 (Marquette County), totaling 18.85 acres, are included in that yard. In figuring the area of the yard, I included streets used, making altogether 25 acres. In my judgment, this yard has a special adaptation for railroad purposes.

Mr. Wykes: Just a moment before you answer, I wish to object to it as immaterial and incompetent and not the proper way to fix the value of a large tract of land which in acquiring must be acquired in individual parcels; that is, if the problem be to acquire, it must be taken in individual parcels and not as a whole, and it is not the value to the railroad company, and this method is a method which seeks to get the value to the railroad company.

That value may be arrived at by considering it in comparison with the next best parcel of land of proper size for the same purpose, comparing the cost of purchase, construction and operation of yards on both parcels. There is no other site as well adapted for a yard, both in point of cost of construction or in economy of operation, as the

south vard.

The next available site is the ore yard, just west of the present shops and roundhouse. It would comprise two strips of land, one 230 feet wide by 1,600 feet long, parallel to and 50 feet north of the center of the present main track, and the other, 456 feet wide and 1,600 feet long, parallel to and 15 feet south of the center line of the present main track, beginning at the western boundary of the south half of the northeast quarter of Sec. 22, 48-25, and extending easterly 1,600 feet—25 acres, the same area as the south yard. I made an estimate of comparative cost, assuming the building of the track to be the same, the only difference being in grading for the tracks. ference in the cost of grading is \$48,735. I assumed the track material, laying and ballasting to be the same on the new yard as on the I assumed that, if this yard had been built in some other place, it would have been built under the same conditions it is in nowpiece-meal, as they needed it—and that the conditions of building the yard would be practically the same in one place as in the other.

I made conservative figures on the cost. The first item of additional cost is handling coal—130,000 tons handled last year. It would be necessary to handle all the coal the additional distance to the new yard at a yearly cost of \$803, which, capitalized at 5%, makes the additional value \$16,030. The west bound freight trains yearly

cost \$1,003, which makes a total cost of \$20,075, and the freight trains east of Marquette, both east and west bound, cost \$1,204 annually, capitalized making \$24,090. I figure the coul two and a quarter miles, and the freight business one mile, both east and west, extra haul. All freight coming into the alternate yard stopped there; there would be no extra haul. The west bound freight from Marquette would have to be hauled around by the south line, an additional haul, and both east and west bound freights east of Marquette

would have an additional haul.

I included in this estimate the cost of train operation only. There is a legitimate expenditure for replacement of cars and maintenance of track, which would bring the actual cost, in my judgment, much above the figures named; that has not been included. The total difference between the cost of construction and operation of the two yards would be \$108,960, according to my estimate, which would in my judgment represent the value of the special adaptation of this yard for railroad purposes. If the value of the land in the substitute yard and in the present south yard were the same, then this \$108,960 would represent, in my judgment, the special value of the south yard. I know the value of the south yard land is more than in the sub-

stitute yard. In my judgment, to arrive at the true special value of this land by reason of special adaptation to railroad purposes, it will be necessary to determine the market value for other purposes of the

two sites, and, if the value was greater in the present than in the substitute yard, deduct the difference from this total of \$108.960.

The 130,000 tons of coal represents the haulage of coal to Negaunee or points west, taken from the South Shore dockage. I figured the item of expense on other freight on five west bound trains from Marquette, and three trains each way east of Marquette, making six trains east of Marquette daily for the year, including Sundays. I got my information from the Chief Train Dispatcher. This substitute yard is located on both sides of the main line, and would need no new track, except the yard itself. I would not put it on one side, on account of being more economical to grade it on both sides, and because the objections to having it on both sides of the main line appear in the south yard as well.

Young.

Recross-examination.

By Mr. Wykes:

The substitute yard could be located on one side, and reduce the expense of operation somewhat, but not reduce any expenses of operation to which I have testified. It is an inconvenience to have your main line running through your yard. The amount it increases the yard expenses depends on the amount of through traffic. The east end of the substitute yard would be 4,400 feet from Front St. Part of it is on description 33. Complt.'s Ex. 6a, Riggs. It begins west at the boundary of description 33, and runs 1,300 feet east. It takes in

lands already owned by the railway company, except so much of it as falls on a piece north of the track, 528 feet long by 345 feet wide.

The coal on which I figure an extra cost is only that hauled through to Negaunee and beyond. I figure the extra cost due to having to take the coal from the unloading point up into this yard and then haul it back the distance it must be hauled back to get it onto the west bound track. Coal goes to Ishpeming and Negaunee over the south line. A maximum of ten large cars can be hauled up the hill. There is not room in the yards adjacent to the coal dock, aside from the south yard, to switch and get together a train of that size. That coal plant is used by the L. S. & I. and the South Shore, and there is no room for storage of cars there. The L. S. & I. brings its cars down from the yard and leaves them on the passenger track when it is not used by passenger trains. We make up all our trains at the west yard, after the coal is loaded. I assume that the coal would be taken to this other yard.

There is an extensive yard now, east of this point, used for storage and sorting of loaded ore after it is weighed. If arranging a new yard at this point, they would arrange it so as to best handle the traffic. If they could handle the ore farther west and the coal farther east to the same advantage, that would be done. That would make an extra haul on the ore cars, instead of the coal. The ore cars all

take the south line out.

The figures given are minimum costs. It is an approximation, in which I have attempted to be conservative. I did not go into close fractions of miles, but took half a mile as the distance, when it was actually a little more. I used five per cent, because my experience is that that is a low figure for capitalization of railroad properties now. At six, I get a lower value, and at seven a still lower value. I use five per cent, because I thought it a fair average for capitalization. I don't attempt to say the money could be gotten for that. It is a value that we use entirely in leasing railroad tracks around here.

I figured my extra distance for west bound freight from the freight house to the new yard. The through freight coming from the east would have to be taken to this new yard and back again. The distance would be longer than I have used. I treated it all as local freight. I do not think any freight on the South Shore goes through Marquette without breaking trains.

On February 12, 1914.

Young, called by Plaintiff.

Direct examination.

By Mr. Eldredge:

I have given some study to the question of apportionment of M. of W. & S. expenses between the passenger and freight service. It is impossible to actually divide the causes of these expenditures in a great many cases between the different classes of service, and, consequently,

it is necessary to adopt some arbitrary method, based on the proportion of the use of the causes of these expenses. In my judgment, dividing these on the revenue train mileage is the only fair basis.

As civil engineer, I have had charge of maintenance of way and structures for a great many years. In the course of my employment, I have had to consider the extent to which the two classes of service, freight and passenger, tended to cause the expenditures necessary for maintenance of way and structures. I have to review all the accounts every year, make annual reports of all the expenses in my department and explain the causes of their increase or decrease. That would not specially involve discriminating between the wear and tear caused by freight service and that caused by passenger service, except it does have to do with the wear and tear caused by trains, as units, and their relative weight and speed, would cause discrimination between freight

weight and speed, would cause discrimination between freight and passenger. I would except from the revenue train mileage basis but three items of the I. C. C. classification of maintenance of way accounts; i. e., docks and wharves, maintenance of joint tracks, yards and other facilities, debit, and the same item,

credit.

As to the buildings, fixtures and grounds, a part of those could be allocated between the different classes of service, but the unallocated parts are, in my judgment, properly divided on revenue mileage basis. In maintenance of way and structures accounts, certain elements of expense are not attributable to train movement, but to the action of the elements; those are; part of the ballast, a percentage of tie renewals, and quite a large percentage of bridges, trestles and

culverts and over and undergrade crossings.

The whole of the item of over and under grade crossings would be due to the action of the elements, as would fences, cattle guards and signs, snow and sand fences and snowsheds, telegraph and telephone lines, and buildings, fixtures and grounds. I adopt the revenue train mile basis for the division of expenses due entirely to the elements, as it seems to me that the train mile is the unit of service into which the traffic is divided, and as that unit has more of the elements of the cause of these expenditures than any other way of division could have. The cleaning of roadway is done for two reasons, the primary reason being protection from fire, and the secondary reason being appearance, entirely on account of passenger trains. There are two causes of fire; one is the locomotive, and the other the open windows of the passenger train smoking car, which is quite a prolific cause of fire in this country in summer.

I have known quite a number of cases where fires have been caused by throwing cigar stubs from smoking car windows, and many other cases where they could not be otherwise accounted for; e. g., where a passenger train causing fire was coasting down a grade and not working steam, and there wasn't any spark flying. I have personally found cigar stubs in rotten stumps that caused a fire, in 15 minutes after the fire started.

In many of the items, the additional speed of the passenger train offsets any additional weight of the freight trains; that is true on

bridges, to a great extent. The damage to bridges is caused more by train impact than by the actual dead load, and the impact is very much greater as the speed increases; the impact causes the vibration,

and the vibration causes the danger to bridges.

In repairs to track, the freight train on a well kept up tangent would be a little harder on the track than a passenger train, but on a curve a passenger train causes more damage, because the outer rail must be elevated to suit the passenger train speed, and on that account the freight train causes considerably greater damage than it would if the elevation was right for the freight train; also, it reduces the load the freight engine isable topullaround the curve. Especially on a road like the South Shore, where they have no tie plates on curves, it causes cutting the ties by the rail, canting over the inside rail, and spreading the track, making it necessary to reguage often and adds tie renewal. Another item is the creeping of rails in soft places, which is aggrevated considerably by the excessive speed; that is an item that should be divided into train unit.

In removal of sand, snow and ice, there is a difference in favor of the passenger trains, due to the necessity of keeping the passenger trains moving during snow storms. It is customary for freight trains to be left in during heavy snow storms, because it would be impossible

to do any work along the road anyway, on account of not being able to get into the side track, but the snow plows are run to keep the passenger trains moving, and the work they do must be done over again when the storm is over, to clean the road up for general business, as the snow fills in behind the snow plow.

To offset that, there is some cleaning of switches, done more for the freight than for the passenger trains; shoveling out of drifts happens occasionally, when the drifts are larger than can be taken care of by the plow, but, on the other hand, there is shoveling to be done on side tracks that is for the freight service only. I mean that the cost is increased by reason of being obliged to run the passenger trains, and that the greater cost, if there is any difference, should be

attributed to the passenger trains.

On the South Shore, winter maintenance would come under item, Roadway and Track. That item is almost entirely labor; in winter, it is nearly always shimming track on account of heave spots, and this is necessary in direct proportion to the speed of the train over it. Shimming is much more necessary for passenger than for freight trains, because the passenger trains run at greater speed, and it is necessary to keep them riding smoothly for the comfort of the passen-Shimming is quite an item of track maintenance in this country in winter. Without shimming, the track is not safe, especially for high speed. Taking out the shims is quite an expensive job, and must be done at exactly the right time.

The items to which I apply the revenue train mileage basis would on that basis be equitable divided between the two services in the proportion that each had caused the expense; in my judgment, that is the most equitable way. In the absence of any absolute figures as to which class of trains causes any of these expenses, this arbitrary method of division would be nearer to the actual facts than any other

method

285 I don't know that I am competent to testify with respect to the speed of South Shore freight and passenger trains; this question refers to depreciation of equipment, with regard to which I did not intend to testify. I intended to testify only to the depreci-

ation of items under M. of W. & S.

When I said curve elevations not suited to freight service would reduce the hauling power of locomotives around the curve, that is a matter of engineering calculation; but I could answer that only in theory, not having any practical knowledge of the effect on maintenance of equipment. In theory, I think it would increase the maintenance of equipment to some extent. Having in mind services performed by freight trains for passenger and common service, company material handled in revenue freight trains usually is quite a considerable item—the handling of ties, rails, scrap iron, and of material going over into passenger cars and engines. Even coal is sometimes handled in a revenue train. I do not know whether that is charged to the coal or not; It is on this road.

Young.

Recross-examination.

By Mr. Wykes:

I have never testified to the propriety of the revenue train mileage basis for division of common expenses between passenger and freight before; at best, that is an approximation. I do not attempt to say that the division, when made, states the real expense caused by the passenger or freight service. I do not attempt to a solutely place the actual expenses; I don't think it can be done. I only make this basis as an arbitrary basis for the division, and as being the best arbitrary basis. I do not believe it can be done to any degree of refined certainty. My judgment is it is the fairest basis that has

286 come to my attention. By arbitrary, I mean it is merely a method decided upon on which to make this division; in some cases it will favor one class, and in others the other

class, of service.

I meant by arbitrary that it was a method to be followed even if in some instances it was absolutely correct, as long as we are unable to get anything nearer correct; I mean it is a basis that goes outside the direct charge or direct expense, and takes some general rule of division. The reason I select this basis is because in my judgment the train mile is the unit of service.

I have never been called upon to compute the cost of a passenger or a freight train mile, or a series of either. It has been done by some accountants, as near as they could arrive at it, but I do not know how close they did arrive at it. It was done as an accounting,

rather than an engineering proposition.

I have never for a railroad attempted to determine the cost of doing its passenger business. The passenger train is not the equal of the freight train in average length, number of wheels, tractive

force required to pull the load, number of wheel impacts, or amount

of coal required per mile.

Starting with those two unequal elements, I state that the passenger train ran at a faster speed; that, other things being equal, would add to the cost on the items we have been referring to. I have studied the comparative cost, but not to get at it as finely as to find the degree of extra cost that would result from the greater speed, or to say how much more cost would result from running 40 miles an hour than 20; I could not pretend to give percentages, but I have made observation on the track, and been put to considerable extra expense on account of the increased speed of passenger trains over

what they had been running before, and other trains as well. Those tracks were tracks over which, at the time I made my o' servations, both passenger and freight trains were running constantly. The thing I referred to was absolutely certain. In the case of wear, the track had heaved slightly, but not sufficient, as we thought, to shim it; our time for passenger train between two points was shortened, increasing the speed, and we were obliged to brace and put tie plates and shims on this track, in order to keep it to guage, when we had no trouble before the increased speed. If the track had been in perfect alignment, the extra work would not have been as heavy, but it was a typical winter condition in this country. I have not gone so far as to attempt to express in percentage or in amount per train mile the amount or degree of extra cost that would be required by the faster moving passenger train, and do not know any one who has. I know in a general way the relative speed of South Shore freight and passenger trains; I have been riding on them both quite often; I do not think I could give their average passenger speed, and I do not know the maximum permitted by their I do not know their average or maximum speed for freight trains; I know until recently the extreme speed permitted by rule for freight trains was 20 miles an hour, but I don't know what it is

now. I have never observed that they exceeded this maximum.

On the question of speed, the amount of tangent or curve enters into the question of the extra weight that you must give to the speed. I have not made a study of the amount of tangent and curve on the South Shore to reduce it to percentages, but I have been over the road a great many times, and I know in a general way how the road runs for tangent and curve. Railroads vary in the amount of tangent, the amount of curve and the rate of speed; that causes a variance in the accuracy of the revenue train mileage basis, applied to

railroads generally, as a class.

There might be a slight variation, but, taking it as a whole, I do not think, so far as my observation has been, there is any material difference on any great length of railroad in this vicinity. I know sometimes they claim the revenue train mileage basis to apply to all railroads generally as a basis of division between passenger and freight. If it were applied to the South Shore, I would not say whether it should or should not apply to the Michigan Central, without giving the matter more study as to condition.

Q. Have you made any investigation to determine the degree of

accuracy of apportionment of expense that can be reached in the application of the revenue train mileage basis on the South Shore?

A. Personally, I do not think that there is any way that you can

prove or disapprove what is or is not correct or accurate.

Q. And it gets right back to this, does it not, when you consider

the whole subject, it is just a matter of your judgment?

A. Well, that is all I claim, that it is my judgment of what is the proper basis. I would just go back to my statement that it is the most correct basis in my judgment; it is the nearest to the correct basis of any that I know, and also that I have made a great many conservations to prove in certain different items. That is the direct effect of the train as a unit on certain conditions on bridges and track, but not to reduce it to percentages or actual cost.

In instances I have watched the effect of each particular train on certain things independently of the other; e. g., I would be under a wooden trestle watching the effect of the impact of trains on it—a freight train and a passenger train striking and going over the same trestle in an especially weak part I was giving consideration. In

some cases, it was a question of creeping track, where I wanted to determine the effect of the different trains on the track; and then this other case, the effect of the high speed trains

in spreading the track.

In addition to the speed as weighting the passenger side of the wear, I spoke of the super-elevation of curve due to the speed. That is a very material element in the cost of maintaining curves and ties thereon; it also produces some influence on equipment. something that probably takes more of the track men's attention than any other one thing, due to the passenger service-that, and the shimming. In order to determine the weight to be given to the elevation of curves, it would be necessary to give consideration to the amount of curve, and to the degree of elevation, which must be in such condition as to allow the maximum possible speed, if necessary. They must also be in condition to care for the maximum possible speed of freight trains, should that exceed the passenger train speed. I do not think greater weight at the same rate of speed requires greater elevation than less weight; there is no recommendation by any engineering society that recognizes any greater superelevation for heavier than for lighter engines, even on the same speed. weight hasn't anything to do with the formula.

Q. Now, the precise loading of the passenger side, due to the existence of curves and elevation, you have not been able to work that

out as a percentage?

A. No, I never attempted to work it out in percentages or in any other way, except we know when we elevate a curve, for instance, for passenger train speed, that the low side of the curve takes the whole load of the freight train and continually increases the elevation, and it is necessary to take up the low side very often—usually once a year, or even oftener sometimes.

The wear on curves is due to the tendency of the inside wheels of the engine to travel faster than the outside, which keeps the flange against the outside rail; the guage side of the inside

rail never wears on a curve. The only way rail fails is by flowing of metal caused by the slipping of the inside wheel. If done before the rails are too far gone, they can be transposed, and the cold rolled metal is better for the traffic than if it had not been in the track before.

The fact that the passenger train, due to extra speed, is on the track half the time of the freight does not, in my judgment, reduce the fire risk; it makes almost as many exhausts, and our records show more fires from passenger than freight engines. I have considered that the freight trains move under full load, at the maximum power, and burn more coal. I think from the locomotives alone

the fire risk would be about equal.

For sand, snow and ice, there is considerable hand digging, around terminals, cleaning switches, which is quite a considerable cost, but the switches must be cleaned in order to use the main track for the use of the sidings, it being necessary to clean the switches to make the main track safe, both in the country and in the yards. Every switch has to be couned, and that is a considerable part of the expense. The snow slow is put on to clean for both purposes; the passenger trains are kept running during the storm, when freights are not. This snow plow work during storms is not as good as permanent cleaning.

Frequently, the snow plow goes over the road twice the same day, and still leaves the road blocked at night. Some of the side track cleaning is done with snow plows, and some has to be shoveled; usu-

ally, no more men are employed on this account, but the men use their spare time between storms to clean up; that is, the

men in the yard, and section crews.

The shimming is usually done by the regular crews, the size of the crews being guaged by the amount of shimming and other work. Usually, we have as many section men in winter as in summer, when we have a heavy fall of snow. The shims are taken out in the spring by the regular section crews.

As to weighting the passenger side of the cost, I mentioned the carrying of company freight in freight trains. The weight that should be given to this varies in proportion to the traffic; I would not attempt to say how much that was, but, of course, there is a consid-

erable amount of it done.

291

The carriage of workmen on passenger trains is usually inconsiderable, the larger number being carried on work trains. On passenger trains is carried more or less material, supplies, company mail, and passes for both classes of traffic, and the companies' employes of different character. I have not attempted to refine between those, but merely mentioned that item as being worthy of consideration. I do not think of any other thing that would weight the passenger cost, speaking generally of the items mentioned.

Q. You have not determined the weight that should be given to any one, or to all of those collectively, have you; any one separately,

or all collectively?

A. Not any definite figures at all.

There are some things which would make the cost of the freight

side heavier; among those is the greater freight tonnage. termine whether that had sufficient weight to counterbalance the speed would involve an investigation into that greater tonnage; that would affect some of the items, but there are many that it would not materially. I don't think there would be any way of measuring that effect. I don't think it affects any item very affect materially.

much, unless it be the wear of rail, the maintenance of track 292 on tangent, and re-surfacing track. I don't think it affects such items as bridges, though you very often have to strengthen bridges for heavier locomotives. I don't think you would have to get the number of wheels and types of your locomotives in each class. Of course, the comparison between the classes of locomotives would

have some effect.

Bridges seldom fail on account of dead load; they fail on account of impact and vibration, more than any other way. According to my observation, the impact and vibration is not longer and does not become more violent through the passing of a long freight train as the end of it passes over the bridge. The greatest strain on a bridge is when the engine first strikes it, and then it settles down to a steady uniform strain. If the speed was the same, the impact would increase with the increasing weight. Impact is a very uncertain thing with the best engineers; we merely know that impact causes

a lot of trouble, but it is pretty hard to measure it.

I did not give any account, in applying the revenue train mile basis, or in saying it was proper, to the greater length of time that a freight train uses the track in making a given mileage; I do not think account should be taken of this. I did not take that element into account in fixing weather costs. I did not take into account the fact of whether freight trains are or are not as carefully inspected, and whether the wheels are or are not kept up and as frequently inspected, as passenger trains. I did not take into account the greater number of derailments, etc., in the freight service than in the passenger I did consider the different types of locomotives in freight and passenger service. My opinion as to the propriety of the train mileage basis was made up before last night, when I saw this statement; I then knew the types of locomotives, but I did not look

into the details of their measurements until last night. 293 In weighting the freight side, I did not take into account the greater use of terminals by freight trains. I understood that most of these freight tracks were allocated to the freight service. That was not the basis on which I answered that I thought the revenue train mileage was proper. I took what information I had into account, and I understood that there were a greater number of tracks allocated to freight service; that is partly the reason I did not take into account the greater use of terminals by freight trains.

We have woods branches, used for switching, to run in and get freight cars, on L. S. & I., but do not run any trains on them. expense of maintenance of those tracks should be borne by the traffic that passes over them directly. On trackage of this class, we make no train mileage; my idea is that the expense of maintenance of those should be borne by the freight service. I was not informed of the amount of stational switching done by South Shore freight trains. I knew that this stational switching was done, although I did not know the amount of it. I did not take that into account; I took into account the movement of the trains on the main track.

Q. And that is the element that would weight the freight side, is it not; if there is a large amount of stational switching it would make the freight side of it to that extent more expensive? I am

talking about maintenance?

A. These are kept in a separate account; that is, the repairs of the side tracks; they are not kept in the same account with the repairs of main tracks. I do not know whether the South Shore keeps them

together.

Naturally, the stational work of freight trains would increase the maintenance cost slightly, but, aside from rail wear, I do not think it would be noticeable; your weather and wear cost go on just the same. So far as stational switching involves the use of the sidetracks, that did not enter into my division on the revenue train mile basis, as I presume the side track accounts were kept separately, and that their expense, where not used by passenger trains, was assigned to freight. The use of side tracks by freight trains, to allow passenger trains to pass, I attribute to the passenger trains, and that would weight the passenger side further than what I mentioned.

The locomotive movement of starting and stopping does not cause any wearing, unless the engine slips and burns the rails, which is inconsiderable. There may be greater stress in starting and stopping, but it does not seem to hurt the rail any unless the engine slips; slipping is more liable to occur on larger diameter driving wheels, like those used on passenger trains, than on an engine with more tractive power. There is more frequent starting and stopping in freight than in passenger service. I do not think there is any more wear at switches than in main tracks; there is no hammering on the frog, except going in on the side track, to take the sidetrack movement. There would be a little lurch in taking the sidetrack on a sidetrack movement; I don't think the increased wear by a train running on the main line is noticeable.

The only reason I can give why costs resulting from weather depreciation are to be divided on revenue train mile basis is because that is the unit of service; it is just the question of what is the proper method of dividing the cost that the running of the train has no effect upon. I do not think weather costs should be divided upon the relative time of use; in the first place, it would be

295 such a hard thing to compute, and it would be cumbersome.

That is not the reason I did not use it; it is because I did not think it would be fair, or as good a way. I considered that, and thought of several things besides, but have not been able to arrive at anything that was practical, except this train mile basis.

These weather costs are here for the purpose of running trains;

that is the reason that these costs are accrued.

Q. Yes, but when you get back of the whole thing, the trains are run to carry tons and passengers.

A. Yes.

Q. And when you apply the revenue train mileage basis to a division of weather cost, you are right in saying that it is an arbitrary basis, are you not?

I think any basis is arbitrary on those items. Yes.

What expenses are incurred in producing the train movement, the actual movement of the train, that is, the propelling force of the train itself?

A. You mean the labor cost, and the fuel, water and roundhouse

expenses?

Q. The roundhouse expense is not in the movement itself?

A. It is chargeable to it.

Q. It is the water and fuel and labor of the employes, is it not? A. Yes, those are the forces that cause the train to move, and that

cause the wear on the train itself.

Q. If the revenue train mileage is correct, shouldn't it approximate the wear on the train itself. Should not the wear on the tracks?

A. Oh, I don't think that has any relation whatever to the other; I think that the wear on the train itself may be caused 296 to some extent by the construction of the train, whether it is constructed to take care of that.

Q. That is the same thing that is true of the track, is it not?A. Yes.Q. That element would enter into both sides?

A. Well, the point I was trying to raise is that the things do not go together. The track might be constructed well and the train might not, or vice versa, so that the relation between the cost of maintaining your equipment and maintaining the track might not have anything to do with each other.

Q. And, other things being equal, assuming day were equally

well constructed.

A. I would not want to say they would.

Q. Should not the wear produced by a force bear some relation to the force that produces the wear?

A. I don't think so.

Q. Why? A. There are certain elements in a track, for instance, that wear in one place ten times as much as in the other produced by the same force that produces a less wearing in another place.

Q. True. But that same element in the track produces a wear

back on the thing that runs over it?

A. No, there are lots of times in this particular case, a soft track would form a cushion and reduces the wear on the trains. very noticeable in years gone by, where tracks were built on muck dumps, making it very easy on rolling stock and very hard on the track.

I have not attempted to apply any other basis than the revenue train mile basis; I considered several others, but did 297 not attempt to apply them, as I gave them up as not being practicable-not fair to the service. I have never made any figures based on a revenue train mileage basis of apportionment on any railroad. I did not study the accounts of the South Shore to determine it, but am familiar with those of L. S. & I. I have nothing to do with any accounts except the M. of W. & S., and with those I am familiar only on L. S. & I. I did not study them on the South Shore, and do not know what results would be produced.

As to how close the cost divided on the revenue train mile basis would be to actual cost, I do not think anybody could say what the actual cost is, except to devise some method of dividing it from their judgment and observation. I do not know how close the cost divided on revenue train mile basis would be from actual cost, ex-

cept from observation.

Assuming the average number of cars per freight train on South Shore is 17, and it increases the number to 19, and thus decreases the freight train mileage, while the passenger mileage remains the same, I should still divide the weather cost the same as I did the other costs in any case, arbitrarily, on the revenue train mile basis. I do not think it would change the situation in any way regarding dividing it on a mileage basis; this is regardless of the fact that the company did the same business, with less car mileage, and that the factors of division were not factors which produced or affected the weather cost. That is because we have not in the item of weather cost any precise division, and that you must be arbitrary. The division on the other items would necessarily be the same, and I think those should be the same as the other.

298 Young.

Redirect examination.

By Mr. Eldredge:

In answering Mr. Wykes, that the revenue train mile basis might not be absolutely correct, I meant it might not be absolutely correct in certain portions of certain items; in other words, certain portions

of certain items might overrun and other portions underrun.

I think the question of delays to freight trains by precedence given passenger trains would enter into my judgment, but I did not speak of it because I was dealing only with M. of W. & S. costs. In my judgment, the revenue train mile basis would assign less of the cost to the passenger service than ought to be charged to it. I intended to say that, if there was any error, it was in the way of imposing costs on the freight traffic that ought to be borne by the passenger traffic.

I intended to say that the tracks in exclusive freight use were probably allocated to freight service alone, and did not come into this. We carry side tracks on L. S. & I. as a separate item, but don't separate between passenger and freight. The ore yards, for instance, I didn't think were included in the total of M. of W. & S. expenses.

I also had in mind track serving exclusive freight houses; as a matter of fact, I merely had that idea in mind, thinking that these particular tracks had been allocated on the appraisal of the property. I

don't know any way the cost of maintaining those could be gotten at, unless by changing the system of accounts and keeping them sapa-

rately in the time books. In the application of the revenue train mile basis in determining these maintenance charges, I think the exclusive ore and exclusive freight tracks in any large freight station ought to be ex-

cluded, before the method will correctly divide the expenses. If the passenger tracks and the freight tracks are approxi-299

mately the same, neither one ought to be excluded.

I had in mind, when I said that (evidently referring to cross-examination), more especially the tracks used exclusively for iron ore. I do not know but what there are some places where you might have some exclusive freight tracks that are not offset by passenger tracks. As I think of it now, I don't think of any; in this town, there are probably more passenger tracks than freight tracks.

Young.

Recross-examination.

By Mr. Wykes:

I did not have in mind, making this division, that these branches, such as traffic spurs, industry tracks, etc., over which no train mileage is made, were included in this maintenance. I thought they were and that they ought to be set apart to freight.

My Wykes: I wish to make a motion to strike out Mr. Young's testimony in entirety, because of making a division of expenses upon an arbitrary and a fanciful basis, not being an actual apportionment, and being out of line with what is permitted by the recent decisions of the United States Supreme Court.

Young.

Redirect examination.

By Mr. Eldredge:

Since previously testifying, I have examined Complt.'s Ex. 1a, Riggs. I then stated it was my judgment that a division on the revenue train mile basis would give a larger share of the burden to freight traffic than is absolutely fair, after exclud-300 ing certain trackage I mentioned. I have gone over this exhibit, showing the lengths of the tracks, and have drawn off the tracks I intended in former testimony to exclude. I find on figuring the length of track that the amount of maintenance on them would be relatively so small that I am quite sure a division on revenue train mile basis would not only include this cost, but more, and, in fact, I think nearly enough to include all the branches, which I testified should be excluded.

I said all the branches and certain of the side tracks, in amount (now ascertained) 45.32 miles, should be excluded; an estimate of maintenance on that amount of side tracks would be about \$11,000 a year—a very small percentage of the total maintenance charge. am sure that there is enough other costs to more than make up this difference. I estimate cost of maintaining side tracks as \$250 a mile, that being the average cost of maintaining side tracks on L. S. & I., where the traffic is much heavier than it is on these tracks; \$300 a mile for maintenance for industrial branches and \$375 a mile for mine tracks, as fixed by Mr. Lytle, are, in my judgment, high.

I have a record of actual cost of maintaining some mine tracks in which South Shore owns an interest and of which it maintains a part; this cost, covering 4 years, averages \$180.15 per mile, the highest cost being \$360.38 and the lowest \$30.45. The average of the two high years is \$325.88; the two low years were years of evidently light traffic on these tracks. On M. M. & S. E., where we have kept similar tracks to the industrial tracks, our average maintenance cost for 1913 was \$142, which was higher than two previous years, on account of more tie renewals.

The side tracks from which these figures were derived were our ore yard tracks, where we have our heaviest traffic; our ore cars 301 are higher center of gravity than most of the South Shore ore

cars and the tonnage through these yards is pretty heavy. am confident that the side tracks, as a whole, on the South Shore would not approximate the cost of these particular tracks. The ore tonnage is greater on the L. S. & I. than at the special vard at Presque Isle where all our iron ore passes through; the tonnage of ore on L. S. & I. this year was 2,250,000 tons.

Young.

Recross-examination.

By Mr. Wykes:

Q. You have stated that in your judgment a larger proportion of the cost of maintenance of way is attributed to the freight traffic than is due to it, by the application of the revenue train mileage basis; can you express that in any figures, any percentage, or in anything other than as rests in your judgment?

A. No.

Q. And that depends on all of the features which you have stated, in former testimony, affect the two different sides of the problem.

A. Yes, that depends on those features.

Q. And it is simply your judgment that one would be a little heavier burdened than the other, with this method?

A. Based on experience, yes.

Q. And on the things you have testified to?

A. On the things I have testified to.

The mileage, 45.32 stated, was side tracks and exclusive ore tracks, not including branches. I did not know that there was any South Shore main line not used in passenger business; I did not take 302 that into consideration. I presumed, also, that the branches would be excluded, although I think they would be at least

partially covered by the difference I spoke of. The L. S. & I. cost of maintenance is variable; in 1913 our highest cost per mile of main line was \$945.01, and our lowest, excluding a switching branch, which ran \$211.88, was \$323.49.

Our road (L. S. & I.) is divided into sections, the average cost for

each being:

eith being.	1912.	1913.
	\$669.38	\$914.01
Section 2, from section 1 toward Ishpeming,	845.76	323.49 490.61
Section 3, west from section 2, 7.87 miles	$335.01 \\ 439.73$	434.25
Section 5, south main line (not used for hadi-		194.46
Section 6, North Lake Mine Branch, 6.36	211.88	179.23

1 regard sections 1 to 5 inclusive as distinctly main line. include no expense of side track maintenance; we have that separate. The average per mile for side tracks, for the same period, was:

	1912.	1913.
Section 1, 13.37 miles (9.72 miles in 1912)	\$243.02	\$238.16
g .: 9 99 mile 1913 5 mile in 1912	Trans.	150.40
g 4: 9 1 40 miles 1913, 1.30 miles 1912	121.82	203.21 210.75
0 4: 4 7 08 miles 1913 0.2 miles 1914	152.97 346.09	601.20
C 0 5 76 miles 1913 0 01 miles 1914		123.96
Section 6, 5.76 miles 1913, 2.92 miles 1912		

Section 1 is ore yard, with very heavy traffic; section 2 is ordinary side track; section 3, side track; section 4, there are some tracks called side track, used for loading ore; section 6, 303 track composed almost entirely of yards for making up iron ore trains, and mining tracks, shifted for steam shovels; section 7, mining tracks, to mines not working in 1912.

On Section 7, and some on section 4, the tracks were so new that they needed very little tie renewals. I think the costs on the M. M. & S. E. would run a little lower; our costs on that road ran quite high this year; we did quite a good deal of work there, part of

which is charged to operating.

There is a little higher center of gravity on all ore cars than in the ordinary merchandise freight cars. At high speed, the effect of this is detrimental to the tracks; at ordinary speed it has no noticeable effect. I presume that same thing would be true of a high loading of a freight car, raising the center of gravity; I presume it couldn't be to such a great extent as on an ore car, because the freight cars are so much longer that it would be impossible to get the load in it. Raising the center of gravity has the effect of exaggerating any bad spot in the track at high speed; the engine is the initial shock to the track, but if ore trains were run at high

speed, it would make the track maintenance higher.

I have made no investigation to determine the effect of the continued vibration after the initial shock on track, more than to note the expense necessary to keep the track up. It must add to the rail wear, but I don't know that it would add materially to other costs; it might add to displacing ties and ballast. It has been our experience that it does not add to the creeping of ties.

304 Young.

Redirect examination.

By Mr. Eldredge:

Trains are run on L. S. & I. only from Marquette to Ishpeming; there are only two short passenger trains, and they don't amount to much. The special maintenance in reference to passenger trains does not cut much figure on that part of our road. I wouldn't attempt to make any comparison between L. S. & I. and South Shore. I don't think it would be exactly fair to make comparison. Considerable money has been spent on L. S. & I. and charged to cost of line that materially reduces maintenance charge.

Section 4, is our new main track, and section 7 has no traffic to speak of—an occasional switch engine goes up there for ore, and

last summer there was a passenger train twice a week.

(This witness was later called to testify before the Court.)

305

On July 19, 1912.

Ernest J. Dube, a Witness called by Plaintiff.

Direct examination.

By Mr. Eldredge:

I have resided at Houghton 28 years; in real estate business from 1888 to 1909. I was secretary and treasurer of Houghton County Loan & Investment Ass'n; I know value of real estate, Houghton and vicinity.

I know D. S. S. & A. property described in Complt.'s Ex. 1, Riggs, as Houghton Terminal, 12 acres, 1,550 feet of water front, with riparian rights, depth 150 to 350 feet; I estimate its worth at \$35

to \$40 a front foot.

(Map, Complt.'s Ex. 16, Riggs, showing property of D. S. S. & A. at Houghton, offered in evidence.)

DUBE.

Cross-examination.

By Mr. Wykes:

A piece of property within 500 feet west of terminal on water front sold within 18 months to Carroll Foundry. No other sales of water front property within a year or a year and a half. Within five years, there has been sold in this vicinity, a block of land where Amphidrome stands, a piece to Peninsula Wholesale Grocery Co., and another near and west of depot and terminal. Amphidrome is 200 feet back from water. The piece starts from water front. The Amphidrome Co. paid \$100 a front foot for it with riparian rights. That piece was nearer the village than D. S. S. & A. towards the bridge, north and right back of main business part of city.

The piece sold to Carroll Foundry adjoins Carroll Foundry on east, runs back to Carroll St., and is 200 feet on the harbor line and 190 feet on the back. I was commissioned to sell this piece for \$10,-

000. It sold for possibly \$500 less. Principals made deal; 306 I don't know exact price. This piece lies closer to business part of town than the railroad property. It is only 300 feet from the old town, which is main business section. The terminal grounds are about 800 feet further east. The business center of the town is near intersection of Sheldon and Isle Royal Sts. This difference in location induced me to make difference in price. I added something because it was a large parcel, together, and the only available one for a large industry.

I am not sure it would be worth much less without the railroad on it. If the railroad were in the rear, all this would be more valuable, but lake frontage for business purposes, without railroad connection, wouldn't be worth very much. It would be worth much more than \$50 a front foot if there were no railroad there, the property were all vacant, and it were wanted for railroad purposes.

On January 3, 1914.

Dube, recalled by Plaintiff.

Direct examination.

By Mr. Eldredge:

I know the Mineral Range Station grounds at Houghton, shown on Complt.'s Ex. 16a, Riggs. It lies on the shore of Portage Lake between Is. Royal and Huron Sts., and averages about 440 feet deep along Isle Royal. It is block E and a part of block 4 in original plat of Houghton. In block 4 it is about 170 feet north and south from the Harbor line on the east, and about 115 feet on the west, side. I know its value for commercial purposes; it is \$25,000, exclusive of improvements.

The right of way from east side of Ripley St. to west side of

Quincy St., not including that part of block E occupied as a depot and station ground, is 27,250 square feet, which I value at 75¢ a square foot., basing the value on the properties located each side of it. Between the west side of Franklin St. and east side of Ripley St., the right of way is 15 feet wide and 310 feet long, or 4,650 square feet, which I value at 35¢ a square foot, in the same way. The right of way from the South Shore terminal to the west side of Franklin St., 19,320 square feet, I value at 20¢ per square feet. It is my judgment that this narrow strip of right of way would be salable at present, assuming the railroad was not there, at \$25,928. Assuming that the railroad was off, the people owning the adjoining property, Ripley to Quincy Sts., would be glad to buy this additional strip, to add to the properties they already

own, and to pay this figure, in my judgment.

The Houghton people are seriously handicapped by not having a street on the lake front. We have a part of a street in the block, Franklin to Ripley, and no communication from that point to Quincy, so all the heavy traffic has to climb a hill and come on Sheldon, our best paved street, and the question has often been raised to acquire a street on the lake front, but, on account of extremely high price at which property is held, we have been unable to finance the proposition. If this right of way was vacated today and the village was privileged to buy it for 75¢ a square foot, it would be a quick transaction, in my judgment. Another reason for this value is that on each side of the right of way, between Ripley and Quincy Sts., is located the wholesale industry of Houghton. The Copper Range has purchased a right of way up to Quincy St.; (under objection as speculative) they are very auxious to come in, to serve these wholesale interests, and, if this right of way should be purchased by the Copper Range at 75¢ a square foot, there would be an opportunity to make some money, if I could purchase it at that price, and sell to them.

My opinion is, the ground lying north of the right of way, between Portage St. and the west end of the terminal, is more valuable than the terminal grounds. I am of the opinion that at the time the railroad came (1882 or 1883), this piece of ground from Portage St. toward the terminal was more valuable than the terminal property, as part of this was already platted, and several industries were already established on the lake shore adjoining the village plat, which plat was from Dacotah St. west to Franklin St.

309

On July 19, 1912.

WILLIAM D. CALVERLEY, a Witness called by Plaintiff.

Direct examination.

By Mr. Eldredge:

I first came to Houghton in 1860; have lived there continuously since 1881. I have been connected with a real estate firm there most

of the time since 1881, first as bookkeeper, and later as member of a corporation made up of large real estate owners. I have dealt in lands a great deal, buying and selling, both representing the corporation and myself. I own real estate in both business and residence portions, and know value of real estate in Houghton.

I know the property described in Complt.'s Ex. 1, Riggs, as Houghton Terminal, 12 acres, 1,550 feet of water front, depth 150 to 350 feet, and consider it worth \$40 to \$50 a front foot; I would prefer to

call it \$50.

CALVERLEY.

Cross-examination.

By Mr. Wykes:

Values have increased very materially recently in the section around Houghton to Chassel.

The Carroll tract, of which Mr. Dube spoke, is west of the terminal, adjoining, on the west, Crow's property, which is west of the building

on Complt.'s Ex. 16, marked "office."

The center of business section is 1,000 feet farther west than the Carroll tract; terminal is east of Carroll tract. Carroll tract runs back 400 or 500 feet from Lake front. The land there has not been platted; is sold by metes and bounds. I don't know the front foot sale price of Carroll tract. The Amphidrome parcel is still further towards the business section than the Carroll tract.

310 CALVERLEY.

Redirect examination.

By Mr. Eldredge:

The Amphidrome property, costing the Amphidrome Co. \$25,000, practically \$100 a foot, is not nearly so deep as railway company's property. The present value of the Amphidrome property, exclusive of buildings, is at least 10%, possibly 25%, more than we paid for it. The sale was 10 or 12 years ago; value has changed since. On dock property, it has not enhanced materially, because boat companies have agreed only to deliver to one dock in a town, but, gen-

erally, growth of city would make it worth more.

The South Shore road, on the 63 acres east of School of Mines, runs a few rods from Portage Lake. The property on bluff sloping down to lake is the valuable property. It isn't possible for the railroad to run through best property, as the railroad lies down on the level. It is the right to the water front that adds largely to the value; to some extent, the railroad interferes with that here, because, running so close to the water front, there isn't room between it and the water front. So, between railroad and lake, generally, railroad decreases the value of the property very much. If there were sufficient room for cottages between railroad and lake, land there would be readily salable at much larger prices than I have named.

CALVERLEY.

Recross-examination.

By Mr. Wykes:

The quantity of water front property on the market at Houghton is limited, and the price is affected thereby. If ½ or ¼ of the water front at Houghton were thrown on the market, there wouldn't be any ready sale for it at prices I have named.

CALVERLEY.

Redirect examination.

By Mr. Eldredge:

It certainly would be difficult to sell, if half or a quarter were thrown on the market at one time. That doesn't affect my judgment of present value, as that condition isn't likely to occur.

312

On August 26, 1912.

WILLIAM P. BELDEN, a Witness called by Plaintiff.

Direct examination.

By Mr. Eldredge:

I am 39 years old now, and reside at Ishpeming; previously at Grand Rapids. I have been an attorney for 17 years; was the local attorney for Michigan Central Ry. three years; have had experience in acquirement of right of way for railways, public service companies, and power plants, in Upper and Lower Peninsulas.

Near Grand Rapids, in Lower Peninsula, we paid two to four times the ordinary acreage value of land, to secure a right of way across a forty or other description of land. Same thing is true of Upper Peninsula. I have acquired at least 25 miles of right of way for all classes of corporations, 5 miles in the Lower, and 20 miles in the

Upper Peninsula.

I remember the L. S. & I. acquiring right of way in Marquette county, from the C. & N. W. The land was sand plains, without cultivation or improvement; value was in no way affected by possibility of minerals. The price was \$25 per acre. We got at least two miles of sand plains from C. & N. W., by purchase. We condemned a right of way on one forty, and possibly two, of same character, belonging to a private party, and paid \$30 an acre for it. The character of that land was the same as land from Chocolay, on South Shore, to Sand River. As a result of that experience, Cleveland Cliffs Co. adopted the policy of fixing \$25 an acre for railroad right of way, to all railroads, across lands of that character; to this \$25, minimum, we add timber value, if any. This, I believe, is cheaper than the land can be acquired by condemnation.

I have been interested in purchase of many pieces of land in Negaunee and Ishpeming; and I know the value of lands there, generally. I know the right of way of South Shore within corporate limits of Negaunee, known as the north line, as well as the new line of 2.6 miles near Negaunee mine. I also know south line, which extends from a point in the N. E. ¼ of S. E. ¼ of section 34, 48-26, to beyond limits of Negaunee east. In my judgment, a fair average price on that right of way for total of 86 acres, described on Complt.'s Ex. 8, Riggs, as mile post 163 to mile post 164, plus 2,800 feet, the 2.6 miles of new line, and mile post 9 to mile post 12, of the south line, would be \$2,500 per acre, possibly more. I have paid more and less for land in that locality.

1 had charge of negotiations for the 2.6 miles. From mile post 163 to mile post 164, plus 2,800 feet, the value of the land is at least \$2,500 per acre. The value of the land of the new line, 2.6 miles, is \$5,000 an acre or more, beyond question. The value of land, mile post 9 to mile post 12, south line, called the Marquette and Western,

which crosses section 33, is \$2,500 to \$3,000 an acre.

We had to pay, through condemnation or purchase, the prices mentioned, or higher. On this 2.6 miles of new track, we paid \$5,000 an acre for surface value alone, entering into a contract guaranteeing fee owners against loss from ore, which could not be mined because the land was burdened with railroad track. That was across N. E. ¼ of N. E. ¼, N. W. ¼ of N. E. ¼, S. W. ¼ of N. E. ¼, Sec. 5, T. 47 N., R. 26, W. From that point, and following the new right of way across the balance of section 5, and that part of section 6 occupied by the Maas, Lonsdorf and Mitchell Add., we paid \$5,000 an acre for right of way, and located it, when possible, where ore was not likely to be found; i. e., on the rocks, where rocks could be located. The mineral rights are reserved, but mining operations cannot interrupt or interfere with safe operation of the railroad, which got a permanent non-caving right of way.

The right of way of South Shore across this entire stretch of land is permanent non-caving. We paid \$5,000 an acre for it, and contracted to indemnify owners for loss through ore which had to be left in pillars underneath tracks. If ore is discovered, its quantity must be determined, and Cleveland Cliffs Co. will pay its fair value in the ground. I will produce a copy of that contract. South Shore right of way all through here is permanent, and cannot be destroyed by mining operations. Very few such rights of way are

acquired.

Here is a map showing the Maas and Negaunee mines, and the old main line of South Shore crossing between the two. The ore body extends practically continuously from Negaunee mine across to Maas mine, going beneath the railroad tracks; there is a sandy formation which cannot be mined without caving the surface. To release the cre, the Cleveland Cliffs Co. contracted with South Shore to secure a new right of way, approved by its engineer, and to build tracks and fence, set up telegraph poles, and make it in every way ready for use, and South Shore was to abandon old right of way and quit claim to

The South Shore was only to abandon a definite portion cover-

ing exposed mineral body in Negaunee.

I think right of way from center of section 6, near end of old line, to mile post 167, on Complt.'s Ex. 8, Riggs, worth over \$5,000 per acre, as it runs through the heart of town; I should say \$6,000 or \$7,000 per acre, without reference to minerals. I believe the value of 8,700 feet track rights, which is the track paralleling C. & N. W., commencing at mile post 167 and extending to limits of Ishpeming, known as the north line, is \$7,000 or \$8,000 an acre. Considering the title of South Shore, you couldn't buy a right of way across there for \$7,500 an acre.

315 The deeds are not necessarily all alike, but mineral is reserved and might be removed, but in such manner as not to interrupt and interfere with safe operation of the railroad. The bond to property owners runs from Cleveland Cliffs Iron Co. to Pioneer and Arctic, to indemnify them for ore lost through being obliged to maintain*the surface. This is only in case of Pioneer and Arctic com-

pany, and doesn't apply to all of them.

(Mr. Eldredge reads in evidence the mineral reservations of a deed to 8,700 feet, from Jackson Iron Co., consideration, \$1, dated March 17, 1885.) This deed contains no provision as to who shall bear expense of moving track, nor for connection at either end. The Marquette and Western deed has latter provision. The quantity of the estate granted in the deed read was a right of way, an easement-not The Jackson Iron Co. has the land, so that it could grant a right of way without additional purchase, as it has never parted with its mineral rights to section 1, and only a small part of the surface.

The valuations I have given cover the naked land value, without

improvements.

I know right of way of South Shore known as Teal Lake branch, extending from main line near gas plant of Jackson Iron Co. property to mines on Teal Lake. It crosses land of probable mining value all the way; Riggs' valuation of \$1.50 per lineal foot for 7,300 feet is

I know the right of way of South Shore to Milwaukee Mine, 13,680 feet in length, and believe Riggs' value of \$1.50 per lineal foot fair.

I think those rights of way would cost more today.

Considering 12 acres to the mile, I believe the value of south line of South Shore, which is old M. H. & O. line, and which crosses the Jackson Iron Co. and Cleveland Iron Co. lands and 316 follows the L. S. & I., to be \$3,500 an acre.

(Mr. Eldredge states deeds to M. H. & O. right of way are straight conveyances, with no question of trackage rights or conditions involved, except reservation of the mineral, and produced deed from Cleveland Cliffs Iron Co., dated June 16, 1871, which he read into the record; he also produced and read deed from Cleveland Iron Mining Co. to the Iron Mountain Co. dated June 3, 1857.)

I know south line of South Shore in Ishpeming, west from that concerning which I have just testified. It contains 38.2 acres, and runs through a section of the city available for business purposes. I believe it worth \$3,500 to \$5,000 per acre. I know north line in Ishpeming, and believe it worth \$7,500 an acre through the center

of town.

I would place an average valuation of \$5,000 an acre upon that strip extending to limits of Ishpeming, both east and west, covering the business section of the town and from the East New York mine until you get out beyond the present Cliff shaft. I am considering the kind of right of way the South Shore has. If a railroad company were willing to take a right of way from which the mining company could compel it to move, on notice, it could get it for less. The prices I have named represent the actual value of surface rights, such as South Shore has, but you could not buy for that price.

Here, mineral rights are reserved but the railroad rights are predominant. (Witness illustrates, by relating failure of Pioneer Iron Co. to reserve right to compel removal of tracks when deed was made to the Iron Mountain Railroad in 1857, which failure, he says, cost

the Cleveland Cliffs Iron Co. several hundred thousand dollars in building a new line of 2.6 miles and trading that for the old.) Such experience demonstrates the great value of permanent rights of way, which could only be procured today at prohibitory prices.

(Mr. Eldredge states that 5,000 lineal feet right of way through the beart of the business part of the city has been excluded from the last testimony of witness.)

I would put a valuation of \$3,500 an acre on the strip of land extending from Union Park to a short distance west of mile post 169 on north line, as it is vacant land. I would put about the same valuation on that strip west of the heart of the town, extending from Cliff shaft to Winthrop Junction.

(Mr. Eldredge here read into record deed from Excelsior Iron Co. to Marquette and Western Railroad Co., dated 26th of November, 1886.)

I would say that that section of a mile or so extending through the heart of Ishpeming from the gas plant on the east, out to Cliff shaft mine on the west, is worth at least \$12,000 per acre, on the theory of six lots to the acre, since this strip is lined by buildings used for business purposes. This averages \$2,000 per lot. I feel certain a right of way like this could not now be purchased for Riggs' valuation of \$150,000.

I believe the 23 acres in Winthrop branch of South Shore worth \$2,500 an acre; an average price for right of way of Palmer Branch,

to the Palmer mine, is \$2,500 to \$3,000 an acre.

The value of the 3.2 acres right of way of Mary Charlotte branch, bought of the Cleveland Cliffs Iron Co. with a removal clause on 9 months' notice, is, in my opinion, \$3,500 an acre; we paid \$5,000 an acre for one similar.

(Mr. Eldredge produced deed dated Nov. 15, 1910, from Iron Cliffs Co. and South Shore for 3 strips of land. He stated it contains

most unfavorable reservation clause of all, to effect that if grantor cares to use right of way granted, for mining purposes, it shall give grantee 9 months' notice, and if grantee fails to remove tracks grantor may remove and charge expense to grantee. Also, after such notice, grantor shall not be liable for damage to any property, and shall be saved harmless by grantee, if latter does not remove tracks.)

I consider that branch profitable enough to justify paying \$3,500 per acre for right of way; it hauls lots of ore, and will for years. In fixing that price, I took into consideration that much of the land in that vicinity has been entirely withdrawn from the market by mining companies, that they will neither sell nor lease, that land in the vicinity of the city commands a very high price, and that we have paid for our railroad as high as \$5,000 an acre.

I am not sufficiently familiar with land west of Ishpeming limits to put a price on it. We bought right of way for L S. & I. as far west as Joplin, up in North Lake district. We paid the value of the land plus timber value, with the proviso that the grantor can put us

off on 9 moonths' notice.

I think the value of main track from Winthrop Junction west, which connects the two main tracks and is called "the horn" (1,000 feet in length), is about \$3,500 an acre.

319 BELDEN.

Cross-examination.

By Mr. Wykes:

The line of L. S. & I. to Joplin was acquired under my general supervision within last year or two; the titles obtained were similiar to that in last deed Mr. Eldredge read, providing for removal at option of mining company at a stated period at expense of railway; I think but one deed without that provision. We paid about the surface values there. The land is not exactly agricultural land; there are some farms out there. I don't suppose that land worth over \$25 an acre, but this crosses mineral district, and to purchase permanent right of way I feel certain would require from \$2,500 up, because of possible damage to mining operations. There is a vast difference in acquiring these rights of way, as to the quality of rights of way you want to get.

An important element would be the fact that they are not permanent; yet, in city rights of way around Ishpeming and Negaunee, the land has an actual surface value in the market at prices approximating those mentioned. When I spoke of \$2,000 an acre in Ishpeming, I meant a lot, say, 6 lots to acre; that is a very moderate commercial value of that land aside from railroad purposes. Add to that, excess cost for railroad purposes, and you would get amounts approximating what Mr. Riggs had. In my experience, we have to pay several times the commercial value of land, to get it for right of

way purposes.

When you go through towns, procuring rights of way, cutting across city property, the owners always insist that the location of railroad track in the vicinity of their property is of itself an element of damage, and they raise the price accordingly. I cannot lay down an exact rule, but we have had to pay 2 or 3 times ordinary value, even in cities—right in Negaunee—both by condem-

nation and by purchase.

The clause in a deed requiring railroad company to remove tracks at option of grantor would be a distinct disadvantage to railroad company, regardless of whether in city or some other mining locality, as removal might cause very large expenditures, and it is almost impossible for railroad to get new rights of way through that district. There are extensive mining operations carried on in vicinity of these cities; they are mining underneath Ishpeming.

The Cleveland Cliffs Co. controls Iron Cliffs Co. I had charge of sale, by the latter to South Shore, of right of way of Mary Charlotte Mine; transfer one of considerations for inducing South Shore to give up oid rights of way and consent to removal of their tracks to new right of way. We purchased, built and equipped 2.6 miles of new right of way for them, besides furnishing this, and at least one

other, right of way deed.

The values I placed, ranging up to \$12,000 an acre, were not entirely based on idea that title of South Shore did not require removal of track at sole option of mining company at railway company expense. I considered permanent right of way of greater value than one which could readily be removed, but have learned that lands through Ishpeming and Negaunee command a high price for market purposes. The purchases I have in mind are purchases for surface rights for mining companies. The mining companies platted and sold lots on the surface, and the deeds drawn in light of experience of mining lawyers of that time did not contain caving clause. Now, all sales reserve right to cave the surface, if necessary, for mining purposes. We paid very high prices for surface rights containing those reservations. That varies considerably with the location

321 and structures on the land. The mining company has no right to condemn for caving rights, and there is no way for it

to acquire, except by purchase.

In Forsythe Township, Marquette County, in Gwinn district, the Munising Railway Co., to reach certain new lines, including one on Sec. 35, condemned lands, securing an award of about \$30 an acre; the expense increased the cost to over \$300. That was in district where we were paying \$25 an acre to C. & N. W. The ownership of lands in the locality where these condemnations were made, was not in the mining companies as generally as in the Ishpeming and Negaunee district at that time. Since that time, the Clevelan 1 Cliffs has fixed a policy of \$25 an acre, plus timber value, in sales for railway purposes.

In line, mile post 163 to mile post 164, plus 2,800 feet, I fixed a value of \$2,500 an acre, average; some was purchased below, and some above, that price. Across the same sections, I condemned a right of way, a year or two ago, and across this very tract leading to

our Negaunce mine. In the condemnation proceeding, becoming apprehensive that we were not going to get the track at all, because of possible value for mineral purposes, I filed a waiver of rights against the mineral estate, and stipulated that if mineral was found, and mining operations required, we would remove the track at our expense; that waiver was subsequently ratified by our board of directors, and I then got a verdict at from \$1,000 to \$3,000 an acre for that right of way. We crossed the Barassa, Marketti, and Martell parcels. They were owners of land lying east of Negaunee mine, in a region where existence of ore was uncertain. The mining companies have had options on some of that land, which were abandoned; yet it is possible mineral region. The attorneys for defendants pressed the value of the property for minerals pretty strong. and raised the question of validity of the waiver, but I told

322 the jury it would be ratified by our company, and they evi-

dently relied on that.

Opposing counsel made the claim that the waiver would not accomplish what I claimed for it, and that it was not binding; that point was presented to the jury, and there was no decision upon it by any authority except so far as it entered into the jury's determination. I was afterwards told by two or three jurors that if we had not done that we would not have gotten the verdict. The highest price paid in this condemnation proceeding was along this piece of tract I am asked about. I paid \$300, with a removal clause, across a forty near there for the L. S. & I.; I think that was the lowest

The lowest price paid without a removal clause was where we paid the Pioneer and Arctic Iron Co. \$5,000 an acre on new 2.6 miles right of way, and Cleveland Cliffs entered into a contract agreeing to indemnify Iron Co. from all loss of ore, if ore was found, which might have to be left as pillars to sustain the track. I don't think we have bought or condemned any right of way in locality of Barasso tract except that had removal clause; all our rights of way had removal clause except this South Shore track, and I would think the lowest we paid there was about \$1,000 an acre; that was by condemnation, and was the Martel tract. I have in mind that the South Shore has a permanent right of way through there; it gives it a greater value than these other rights of way with removal clause.

I believe land owners there would be glad to pay \$2,500 an acre, or more, if South Shore would exchange its rights of way to one which would permit a removal whenever mining operations required it. The removal clause does not cut much figure unless in ore district.

Where South Shore track is, is a possible ore district. It is 323 difficult to say where eastern boundary of ore basin is; it may

not extend that far east.

Q. In your condemnation proceeding, in which you condemned the Martel, the Marketti, and the Barassa tracts, as you have stated, wasn't there an attempt in that proceeding to indicate the ownership of most of the lands in the locality by the Cleveland Cliffs and the associated companies, and the fact that those companies would not sell under certain prices, which were very high?

A. Yes, they attempted to show that; they attempted to show a

good many things in that case.

Q. The jury was somewhat influenced by the fact, was it not, that the L. S. & I., which was a constituent company of the Cleveland Cliffs, was purchasing that property:

A. I don't think so. I think in the end, as soon as they got by the question that they were possibly tying up any material value there was in these lands, they then sat down and figured out what they thought was the fair value of the land exclusive of the mineral element.

Q. But that influence was urged upon the jury by the attorneys in that case, both by the questions and by argument, was it not?

A. They urged it.

Q. And very strongly. A. Well, I didn't think so. I thought it was a good deal of a bluff.

Q. In that proceeding, didn't certain of the witnesses testify to values there of \$100 an acre for the lands that you were about to

take-certain witnesses for the railroad company?

A. Well, I don't remember; we offered proof tending to show a very much lower value than the jury awarded, and I don't recall now just what those figures were. I haven't looked up my notes.

Q. Who were the witnesses. A. Well, let me see, we called, as I remember, Mr. E. C. 324 Cooley, of Ishpeming, and I think we had Mr. Asire of Marquette, two that I have in mind, outside of any connection with our own people. I think those were our two principal witnesses on value, outside of questions I asked our own men.

Q. Were the records of the proceedings taken down? A. Oh, yes.

Q. Transcribed? A. Yes, they were never written up because there was no appeal taken. We paid the judgment, and the other side did not appeal.

Q. Isn't it a fact that in that proceeding Mr. Townsend testified to

a value for those lands of \$100 per acre?

A. Well, now, I don't remember what value Mr. Townsend put on them; I know it was a great deal lower than the jury awarded,

Q. Do you remember what value Mr. Cooley put?

A. Well, I started out to prove in those proceedings a valuation of a \$100 to \$125 an acre, or something like that, and I might say frankly that I thought these figures that I am giving you when I first began to have to pay them were pretty high—that they were in the nature of hold-ups. But when I found that all other railroad companies were paying the same, and that those values generally prevailed, I made up my mind that perhaps I was wrong.

Q. You started out with the idea that was worth about \$125 an

acre?

A. Something like that; I thought these prices were too high. I thought so, and I went out and contested several condemnation cases around Negaunee, on the theory that we were being held up. and when I found these different jurors giving these prices, and other people paying them, I made up my mind that my judgment was wrong.

325 Q. Didn't you fix your idea of \$125 an acre from the fact that in that immediate vicinity, and in the same year of your condemnation proceeding, your company had purchased lands at a

hundred dollars an acre?

A. We attempted to show that the prices we paid a mile or so away from there ought to be governing here, but we didn't take into consideration certain facts that these men showed at the trial, and that is that this was a flat, level region in the vicinity of these new mines which are being opened now at Negaunee and furnish really the only available building site for the new homes that will have to go up in Negaunee, and that is the way they made their—

Q. (Interrupting.) Wasn't that rather proven in the Collins case

than in this case?

A. Both cases. The Collins' is in a different part of town. They are now being opened up. There are two new shafts being sunk, one at the Lucky Star mine, and one at the Breitung Hematite mine, and plans are being made for a third one at the Athens mine, all within a comparatively short distance of this territory. That will mean the employment of hundreds of more men in Negaunee, and those people have got to have some place to live, and, in that case, Mr. Barassa, who tried the case for his father, Mr. B. F. Barassa of Chicago, offered proof tending to show the volue of this property for building lots, and that is the way he demonstrated its value and got his high verdict.

Q. The condemnation proceedings that you have had have all

been for the Cleveland Cliffs or its constituent companies?

A. Have all been for the Lake Superior & Ishpeming Railway and the Munising Railway Companies. I think I also began one for the Marquette & Southeastern. Those are all companies owned and controlled by the Cleveland Cliffs Iron Company.

326 In fixing \$2,500 as an average price, I considered number of sales at lower and at higher prices. City of Negaunee condemned N. W. ¼ of Sec. 33, T. 48 N., R. 26 W., for cemetery. It lies north of east end of new south track, 2.6 miles long. I finally

paid \$300 an acre for it, after being asked \$450.

I did not consider this 40 acre tract as being \$3,000 per acre, in arriving at \$2,500 valuation. We used about 25 acres of the 40. It was the N. W. ¼ of N. E. ¼ of Sec. 33. The deed reserved minerals. I have not made computation to get at this \$2,500 valuation, but base it upon various transactions I have made, considering both worth and cost; in other words, what it would command in market. I have had in mind also right of way we condemned for L. S. & I. on the N. W. ¼ of S. W. ¼ of Sec. 33, the E. ½ of S. E. ¼ of Sec. 32, and the S. W. ¼ of S. E. ¼ of Sec. 32, T. 48 N., R. 26 W.

We condemned lands of 3 owners, the Barassa, Marketti, and Martel families, and purchased from South Shore Land Co. We paid about \$3,000 to Barassa and \$1,000 to Martel people. I don't remember the prices paid South Shore Land Co. There was no other condemnation or purchase on that line. I have also purchased

flowage rights in this section, and right of way for L. S. & I. north of and only a few hundred yards away. For this last I only paid \$300, but we claimed that this seller had no title, and won in the lower court, but thought it safer to buy what title he claimed.

I have also in mind purchases of part of new South Shore main line, starting from mile post 164. All these rights I have mentioned are temporary, and must be moved for mining operations. I have had only three condemnation suits in this vicinity of Ishpeming and Negaunne, none in other counties. We have been talking about the spur extending from north line of the L. S. & I. road,

which runs through the Collins tract over to Negaunee mine. 327I also condemned some rights of way for line through Collins tract. On that part of the line, from Maas mine west past Teal Lake, and over to main line of L. S. & I. west of Negaunee, most of land

was acquired from subsidiary companies of C. C. I. Co.

Purchase price and kind of conveyance have never been fixed on deals with those companies. They owned fee, while owner in Collins tract only had surface rights, and mineral estate would control railroad operations. In lots in that tract, values were affected by pres-

ence of houses.

Main line, where I have fixed value at \$5,000 an acre, was purchased before Barassa and Collins condemnations. Deal was completed Nov. 10, 1908; Negaunee mine owners acted as unit. men fixed the prices for them at \$5,000 across part of Negaunee mine property known on my map as Maas, Lonsdorf and Mitchell Add. Addition lies in S. E. 1/4 of Sec. 6 and S. W. 1/4 of S. W. 1/4 of Sec. 5, T. 47 N., R. 26 W. There was 5.22 acres in that portion of right of way that was fixed at \$30,000 and paid in cash. Balance of right of way across east end of Negaunee mine property, from addition to east end of property, containing 3.20 acres, was adjusted in general transaction, on theory that \$5,000 an acre would be paid for Title to 5.22 acres was held by Lonsdorf, Maas, and Mitchell Three men originally owned in common, but they are dead, and ownership is broken up.

Fee owners have leased mine to C. C. I. Co., which has transferred lease to Michigan corporation called Negaunee mine, which is owned partly by C. C. I. Co. and partly by Lackawanna Steel Co. Geo. J. Maas and Geo. Lonsdorf were committee for fee owners, none of whom are stockholders in C. C. I. Co. or Negaunee mine. Deal was

approved by owners of both fee and lease before title passed. Lease holder had nothing to do with fixing price. Negaunee 328 mine was benefited by removal of track, which interfered with its operations, and will pay a portion of the cost. Leaseholder got none of consideration. Expense of removal was apportioned between Negaunee mine, Maas mine, one-half of which is olso owned by C. C. I. Co., American Mining Co., a subsidiary of steel corporation, and Cleveland Iron Mining Co., a subsidiary of C. C. I. Co. Negaunce mine was only interested in getting best bargain, as it was paying part of price.

The 10.96 acres acquired of Arctic and Pioneer Iron Companies is situated as follows: .11 of an acre in N. W. 1/4 of N. W. 1/4 of Sec. 4-47-26, 3.95 acres across N. E. 1/4 of N. E. 1/4 of Sec. 5, 2.45 acres in N. W.

1/4 of N. E. 1/4 of Sec. 5, and 2.05 acres in S. W. 1/4 of N. E. 1/4 of Sec. 5, all in same township. The other parcel, 2.30 acres, is west of the Maas, Lonsdorf & Mitchell Add.; in Sec. 6, extending across S. W. 1/4 of N. E. 1/4 of Sec. 6. There is also .15 of an acre in N. W.

1/4 of S. W. 1/4 of Sec. 6.

Of parcels in section 6, Pioneer Iron Co. owns surface estate and one-half mineral estate, while other half of mineral estate is owned by Arctic Iron Co. Other parcels in Sections 4 and 5 are owned by these companies jointly, each having undivided half interest in both estates. One-half of Arctic Iron Co. is owned by Breitung-Kaufman interests, who set price on this land, while Cleveland Cliffs interest, which owned Pioneer Iron Co. and one-half Arctic Iron Co., sought of it lies in same section with Martel land. I don't remember exact for ore under tracks.

Cemetery land, purchased for \$300 an acre, is in N. W. 1/4 of N. E. 1/4 of Sec. 33, north of mile post 164, on Complt.'s Ex. 1. Some of it lies in same section with Martel land. I don't remember exact

price paid for latter. Price through here was \$5,000, too, fixed by Mr. Kaufman with reference to value for building 329 lots on account of opening new mines. Three new mines, the Lucky Star, Athens and new Breitung-Hematite, are soon to be opened in this vicinity, to employ many men, and this right of way

was most available for buildings.

About 10 acres purchased was from Maas, Lonsdorf & Mitchell estates; \$30,000 was paid for 5.22 acres. Mr. Townsend was not quite right on consideration, but was right on area, when he said

\$30,000 was paid for 8.93 acres.

There were several matters adjusted in this general transaction. Lease held by Negaunee mine didn't assure it right to cave land, and we wanted that fixed. Furthermore, fee owners claimed that right of way to be abandoned would revert to them as abutting owners. We adjusted these matters, and got new right of way, by paying \$30,000 for privilege of amending lease, \$30,000 for new right of way, and \$26,475 as advance payment on royalties to be allowed fee owners for abandonment of claim of reversion. All told, they got \$86,475, but I have only considered that we paid \$5,000 an acre for this right of way.

This was all one general deal, and it is difficult to say how much was paid for any item. I have always thought we paid more than \$5,000 an acre for this land. \$5,000 an acre was adopted for several other parcels, excluding those purchased from two iron companies and Maas, Mitchell & Lonsdorf estates. One parcel, owned by Iron Cliffs Co., in S. E. ¼ of S. W. ¼ of Sec. 33, went in at \$5,000, as they thought they ought to have as much as others. Expense was to be reapportioned to subsidiary companies by C. C. I. Co.

Parcel in Sec. 33, last mentioned, was in third forty south of cemetery land. Surface estate owned by Maloney, and mineral by Seager and Smith people. We paid Maloney \$3,500 for four acres across his land. His parcel adjoins description in which 330 Iron Cliffs Co. was allowed \$5,000. We had to get two deeds, one from surface and one from mineral owners. I don't remember

what we paid the Seager and Smith interests. There was also parcel (1.70 acres) crossing N. W. 1/4 of S. E. 1/4 of Sec. 33, owned by Burt That was on extreme east end, and price was lower and brings down average.

Of another piece, N. E. 1/4 of S. W. 1/4 of Sec. 33, surface was owned by Martel heirs, and mineral right by the Seager and Smith It is east of I don't remember what we paid for either. the ore basin, although eastern line of basin is very uncertain.

I have now taken all that right of way, and only contract to in-demnify owner was given to Pioneer and Arctic Companies. Prices which were fixed when Cleveland Cliffs interests were represented on both sides were influenced by verdicts in Collins condemnation case. Prices allowed in suit were much higher than we thought land was Connection of the L. S. & I. and C. C. I. Co. was shown in worth. Collins case.

It was shown that C. C. I. Co. and constituent companies held large acreages not for sale at all, or at very high prices. It was also shown that this was the only feasible right of way through Negaunee. I don't think jury was prejudiced by attempted showing that land was wanted by a railroad controlled by C. C. I. Co. I now believe award was about right. We paid award, plus all costs and attorneys' fees.

I have made no purchase near Winthrop branch, but have been over it, and know situation through handling leases and contract between C. & N. W., Lake Superior Iron Co. and L. S. & I. My judgment on value of that right of way is based on my general experiences

in Ishpeming and Negaunee district.

As to Palmer branch, I bought right of way for L. S. & I., 331 running south and parallel with it, out to Rolling Mill mine. We crossed some land owned by the Breitung-Kaufman interests, and also some Pioneer and Arctic, and they charged us \$6,000 an acre, with privilege of requiring removal of track. On Complt's Ex. 8, Riggs, their tracks to rolling mill start from old main line of L. S. & I., on N. E. 1/4 of N. E. 1/4 of Sec. 7, and extend to S. E. 1/4 of same section.

We went across land of Negaunee Iron Co., which is owned by Breitung-Kaufman people, and had to pay \$5,000 an acre for it, on the theory that it was available for building purposes. All land pur-

chased there was from them.

The original main line of L. S. & I. across south side of Negaunce runs by Queen mine, in S. E. 1/4 of Sec. 5, and our deed required us to remove the track. Regent Mining Co., occupying Queen group, notified L. S. & I., and we had to build new main line from Maas mine west, by Teal lake, connecting with our main line at Negaunce.

BELDEN.

Redirect examination.

By Mr. Eldredge:

Character of ore mined under my house at Ishpeming is different from that in Negaunee basin and that on south side of Ishpeming. It comes out in hard chunks, like coal, instead of like dirt. Even in this hard ore, it is necessary to leave large quantities of ore, in pillars, to support the surface. Soft ore mines at Ishpeming and Negaunce are operated extensively on caving system, which means that slice of ore is taken out and support then moved, so that the ground above the surface may cave in; then another slice is taken out and again caved in, etc. This is safer for men, and cheaper.

Whole workings and surface go down in this way gradually.
In south Ishpeming, where old workings of hard ore are, they take pillar out after ore is out of the bottom, and surface is likely to cave. You can see large openings near the railroads and all around Ishpeming. Under my house, the South Shore tracks and town, they leave large pillars, even though they are 500 feet down. Ground between South Shore tracks and C. & N. W. tracks in Ishpeming, to which ordinance provides for removal, is quite level, and cost of removal would be light.

Cleveland Cliffs Iron Co. owns and controls about 2/3 of the stock of L. S. & I., and not all, as previously inferred. Other 1/3 is owned by Jones and Laughlin Iron Co., of Pittsburg, so all dealings are same as though strangers. Same care is used to make all deals between C. C. I. Co. and subsidiary companies just and fair. C. C. I. Co. would charge L. S. & I. same for land as any other Railway.

By known ore bodies, I mean sections where operations have been carried on and ore is located. Until operations have been carried on, no one knows of ore bodies, for certain.

By Pioneer and Arctic contracts, ore not only has to be left immediately beneath tracks, but far enough out on either side of the right of way to support it. If workings were 800 feet deep, you would have to stop mining operations at 400 feet from right of way line; the rule is that ore will cave at such an angle as will take a strip about one-half depth of operations.

Operations in Negaunee mine are about 800 feet deep. We have drilled holes at the Athens Mining property from 1.200 to 2,000 feet down; new shaft at Negaunee mine is about 700 feet.

I think price of \$5,000 for their land is fair. In the Arctic and Pioneer tracts, fee owners know that three new mines would increase population of Negaunee, and that these lots would be available for building. I finally agreed with them. Mr. Kaufman took the position that indemnity from C. C. I. Co. might not be good in future, as company might lose standing. He only consented to railway there at all as an accommodation, and only wanted fair price.

Costs of purchasing land for right of way is very heavy—counsel fees, traveling expenses, gathering data and information, and dealing several times with people through different agents.

I think owners of easterly portion of this tract, who lived away from here, received the fair value of their holdings. People differ as to future of a country, but we dealt with men capable of taking care of themselves. At heavy expense, we hired lawyers in California, sent one from Seattle to Canada, and another on a long cir-

cuit to get those papers signed. The land at the easterly end of the tract, Eagle Mills, is not worth nearly so much as nearer the settled portion of Negaunee.

Cleveland Cliffs Iron Co. was offering land on lease in Negaunee, subject only to mineral right. No mining company will lease without that reservation. Known mineral body extends under settled

portion of Negaunee to some extent.

West end of land I valued at \$5,000 an acre comes right into town. Buildings are near it. Section is built up, and building lots are lim-New main line of South Shore strikes old main line near center of Sec. 6, which on this map (Complt.'s Ex. 17, Belden) is only short distance to where hotel is located, interurban line to Ishpeming ends, and important business buildings are located.

Main street is two blocks away. Best residence district in

Negaunee.

Main street is not paved, but there are sewers, water and electric lights. From there, right of way crosses southern part of Maas, Lonsdorf & Mitchell Add., which contains only a few houses. On south side is Sterling's Add., which has a large number of houses and is available for buildings. We paid \$30,000 for 5.22 acres from Maas, Lonsdorf and Mitchell interests, and Mr. Townsend was wrong in including more than 8 acres to that sum.

It is estimated there are 800,000 tons of ore under the south twothirds of old South Shore right of way, within lines drawn perpendicularly through side right of way lines, which are 60 feet apart. Ore is opened up on both sides of right of way; there is a shaft or two through right of way, so it is well known what is there. That is

only a part of ore for which the charge was made.

As I said before, in order to maintain right of way, assuming depth of 800 feet, 400 feet on either side of right of way, or strip of 860 feet wide, would have to be left, but this 800,000 tons of ore is between perpendicular lines of a forty foot strip of a sixty foot strip. When abandoned, south (we-thirds of right of way belonged to American Mining Co. and north one-third to Cleveland Iron Mining Co.

The Pioneer Iron Co., grantor of the right of way, sold largest tract to one Adams, who sold the land on north and south of right of way and bounded it by lines of right of way. He then quit-claimed to Cleveland Iron Mining Co., which sold south two-thirds of right of way to American Mining Co. South Shore had only an easement, and right of way, therefore, reverted. People who owned land on the south side adjacent to right of way claimed it, and they could dictate terms to us.

Deed from Pioneer Iron Co. of the right of way was pe-335 culiar in that it was a warranty deed of land, while the board of directors had only authorized granting of usual right of way, and copy of their resolution was attached. We took the position that, since instrument exceeded authority, it passed only right of way. South Shore could only acquire land for right of way.

Longest term leases in Ishpeming-Negaunee district are for 20 years, and they are terminable, on reasonable notice, for mining op-

erations. Most are for shorter terms. Many owners of houses here

rent ground for small annual ground rent and taxes. This is general, and not limited to one company. Leases provide that opportunity shall be given to remove buildings upon termination.

Ground rents are small, and only nominal; for instance, lot worth \$1,500 rents for \$12.00 a year. Lease is generally renewed if land is not needed. Leases are not limited to our own employees, although they are preferred. Tenancy is at will, in case mining operations reach point, but is really not at all will, for the only contingency that could terminate the lease is need of land for mining purposes, which need is determined by lessor. Grants of right of way are generally upon same condition. We have some terminable upon mere will of company, but we never accept them if we can help it.

Piece of land we had to perfect title on was in section 33-47-26. Maloney mortgaged it to McKenna, who had no other title of record. We bought from McKenna, and 25 years later Maloney sued in ejectment. We compromised for \$300, but later found deed Maloney had given McKenna, which had never been recorded. We sued Maloney in ejectment, and won. That was description we bought of

Muck.

On December 30, 1913.

Belden, Recalled by Plaintiff.

Direct examination.

By Mr. Eldredge:

I know the property described in Complt.'s Ex. 1b, as item 39, Marquette County. I think its fair market value approximately \$500 an acre. I arrive at that value from the value of nearby or adjoining similar land, without improvements or timber.

Item 41 lies immediately west of item 39. As you proceed westerly, the value increases, and I think the fair market value of that parcel averages \$750 an acre, in present condition, without timber or improvements. In all valuations hereafter, I will consider the land as in the same condition, unless otherwise indicated.

I think item 42 is worth, on an average, \$5,000 per acre. I had

charge of securing that entire right of way.

I don't think I placed a high enough valuation on item 43, when I testified before; I think that parcel averages in worth approximately \$9,000 an acre. My reason is its proximity to the business section of Negaunee, extending from near the fire hall, at Division St., practically to the depot. That is all available and desirable for commercial and business purposes. I add \$4,000 an acre for that reason. I am figuring that as platted, like adjoining property. This parcel extends from the point where the new main line joins the old main line, then to the junction of the south line near the depot; it adjoins the platted portion of Negaunee, and nearly the whole length of the business portion. If that were platted into lots, six to the acre, I estimate they would bring an average of \$1500 apiece, basing my values upon what adjoining lots sell for.

All lot values there take into consideration the effect on the mineral value. I place the value in the same manner that we would place it on business lots adjoining. As nearly as I remember, I included this parcel in former testimony with parcel 42, at an average value of \$5,000 an acre. In my judgment, this property, for city lots, is worth that sum an acre. In addition, it has a mineral value. The value of the right of way is enhanced over its commercial value by the fact that the South Shore has a title which entitles its railroad to remain there permanently, whether mining operations are desired to be carried on underneath or not. I am not placing a valuation on this enhanced value, but one based on sales, assessed valuations and commercial transactions relating to adjoining property.

I think parcel 44, situated in the heart of the business section of Negaunee, has the highest commercial value of any parcel of the right of way at Negaunee, and I give an average value to it, based on the commercial value of the land and adjoining land, of \$12,000 an acre. Item 44 is connected on the east with item 43, which I valued at an average of \$9,000 per acre, and on the west with item 45, which I value at \$7,500 an acre. I place the highest value on the middle part of item 44, which includes the depot sites, and that is considerably higher than the \$12,000 I mentioned to bring up the average of

the whole parcel.

Item 45 extends across the property of the Jackson Iron and Cleveland Iron Mining Companies, from item 44 westerly across the city limits of Ishpeming. I think its fair value, for all purposes, about \$7,500 an acre.

I place an average value on item 46 of \$5,000 an acre, keeping in mind that its westerly end, which reaches nearly to the depot at Ishpeming, would be more valuable than its easterly end.

338 To value item 46½, I divide the property into two parcels, by extending the north line of Canda St. through it. The portion lying south of this line might fairly be valued at \$4,000 a lot, 6 to the acre, and the northerly portion at \$2,000 per lot, 6 to the acre. This property is immediately opposite the depot of the C. & N. W., whose right of way adjoins that of the South Shore on the south, and this particular parcel is a most valuable location for business or commercial purposes. Canda St. is shown on another map as Church St. The property I am describing covers three tracts there, one marked .15 acres, another marked .53 acres, and another marked .08 acres, and below these on the map a narrow strip colored in green. My valuation includes the right of way there, as well as the depot grounds (map of Ishpeming offered in evidence, Complt.'s Ex. 15a, Belden.)

To value item 47, you have to subtract from it the land described under item 46½, which takes the depot lots and 460 feet of the right of way. On the remaining 4,550 feet, I place an average value of approximately \$12,000 an acre. I previously testified that items 46½ and 47 could not be acquired for less than \$150,000. I still adhere to that view, because that involves consideration of the cost, at present, of attempting to secure, by purchase or condemnation,

through the heart of Ishpeming, a right of way for railroad purposes. I reached that conclusion by different methods of valuation entirely than the \$12,000 an acre that I have given here, where I am speaking only of the value of this land for commercial purposes based on the value of adjoining land, exclusive of consequential damages or anything of that kind.

Item 471/2 would be worth about \$600, without improvements.

I modify the valuation I put on item 48, of \$3,500 an acre, when I testified before, to about \$2,500 an acre. A portion of the land is not so very valuable. Its easterly end reaches over to the soft ore formation of the property on section 16, where Hematite Mine, of the Lake Superior Iron Company is located.

I am fairly familiar with the value of the right of way of the South Shore road west from Winthrop Junction, as far as Clarksburg, or about 10 miles west of Ishpeming. This would include item 49 and part of item 50. I place an average value of at least \$100 an acre on that 10 miles of track; it might have a value in excess of that, on account of the permanent character of the right of way. I am not sufficiently familiar with the mineral formation all of that distance to fairly appraise the value of the permanent non-caving character of the right of way; I know from experience in purchasing rights of way for the L. S. & I., which parallels the South Shore for 7 miles of this distance, that it has a value of at least \$100 an acre through that territory, exclusive of mineral prospects. That is what our right of way cost, on the average; our right of way is conveyed by a deed which gives the mining company the right to require the railroad to remove, on nine months' notice, in case the line is needed for mining The South Shore has a right of way which cannot be interrupted for mining purposes, whose additional value I am not attempting to appraise.

I place an average value on item 58 of about \$3,500 an acre. I place an average value of about \$500 an acre on item 59.

I put an average value of about \$3,500 an acre on item 60. That includes only the part in actual railroad use.

I give an average value on item 61 of \$5,000 an acre.

I place a higher value on item 62, because that brings the right of way up to the depot property. I give an average of \$7,500 an acre to parcel 62. There is a piece of right of way owned by the South Shore across this property, but it has not now railroad tracks upon it; it is where the overhead crossing of the Northwestern used to be. It is of the same value as the remainder of the parcel.

I put an average value of \$3,500 an acre on item 63. The most valuable part is in section 10, where it crosses the platted portion of Ishpeming, and across big working mines. A part of this line described in item 63 crosses the Jackson Iron Co.'s property. There the element of value, calculated with reference to this being mineral property, is high, though it is not in the platted portion of Negaunee. It is 60 foot right of way from mile post 167.06 across section 1, about 34 of a mile.

I give item 64 an average value of about \$5,000 an acre. In previous testimony, I valued item 65 at \$2,500, or more, per acre. I

then had in mind the cost of condemning that land and the consequential damages to adjoining property, but, based on the decision in the Minnesota Rate Case and valuing this land with reference to its value exclusive of such damages, I think I would reduce that to about \$500 an acre.

I value item 66 at about \$500 an acre, and item 67 at an average

value of about \$3,500 an acre.

I value the track rights to mines, being items 68, 69 and 70, in the same manner that Mr. Riggs and I valued others of the I ranches in my previous testimony-about \$1.50 per lineal foot.

I previously valued item 71 at \$2,500 an acre; I think that ought to

be reduced to about \$500 an acre.

On Defts, Ex. 21, Hansel, is a narrow strip of land, colored 341 yellow, commencing a little west of the Harvey lots and connecting the south line of the South Shore with the Palmer Branch. This is included in item 62. It is substantially the same value as the other land in item 62.

BELDEN.

Cross-examination.

By Mr. Wykes:

I am an attorney for a railroad located in this same locality. tified on the previous hearing that it cost considerably more to purchase lands for railroad purposes than the normal value of the land, say, three times as much. That is borne out by my experience in the

territory that I have been testifying about this morning.

I have condemned land for railroad purposes in this locality. In those condemnation proceedings, we had a number of witnesses who testified to very much lower values than I have given here today. Those lower values were not accepted by the jury, who, in each case, put values as high or higher, on mere surface rights, than I have placed here on permanent rights of way. The surface and mineral estates throughout this territory have been separated by deed, and are largely owned by different parties. In some of our condemnation cases, the petition was filed only against the surface owner. demnation suit tried in this county in the last ten years has ever gone to a decision on the value of a permanent non-caving right of way in the mineral district.

I think item 39 is not underlaid with known ores. The ore formation shown on the government geological maps does not extend as far easterly as this parcel. Geologists feel considerably uncertain as I eliminate the reto the exact easterly limit of the ore formation.

mote possibility for minerals in valuing that parcel. taken into consideration the topography of the country there, 342and that this entire territory surrounding Eagle Mills has been acquired and is held as a town site for use, with reference to the territory east of Negaunee, where new mines are being opened up, and also its suitability and adaptability to railroad purposes as now used, but without allowing anything for consequential damages.

Eagle Mills has no population. The entire city of Negaunee is believed by geologists to be underlaid with iron ore, and that it is only a question of time when that city will have to be removed, to permit the mining of ore. This territory to the east, down as far as Eagle Mills, has all acquired greater value because that is the only place that the town can be removed to. That land is all acquired down there, by what might be termed permanent holdings, with a view to the future. West and south, you go right into the mineral formation again; to the north, the topography is not desirable for a town site. Nothing has been done to remove buildings to this place from Ishpeming or Negaunee; but within the last two years, the city cemetery, containing over 6,000 bodies was moved, as the first step in this direction, from the ore formation near the mines in Negaunee down to more than half the distance toward Eagle Mills; and it was put in that direction because of the probable location of the town in the future.

If that removal should take place, it would send values in Negaunee high up, because you have to buy that property before you can secure the removal of these buildings. The cemetery has gone a mile and a half west of Eagle Mills and at least 2 miles from its old location in Negaunee. If you were to eliminate the possibility of the removal of Negaunee to Eagle Mills, then I would treat this right of way at Eagle Mills about the same as the right of way west of Ishpeming, \$100 an acre. We purchased N. W./N. E. 33-48-26 for \$12,000, or \$300 an acre, several years ago. It is about ¼ of a mile from this right

of way, and I know that the C. C. I. Co. now holds this Eagle
Mills land at value I have given, or more. Within the last
year, plaintiff bought a small lot here, for a section house, and we
charged them \$200 for it. They have not bought it yet, but are to.

The property in the city of Negaunee is not assessed as high as the valuation I place on it, and I have not considered assessed valuations, except in an incidental way. I think the assessed valuations in Negaunee are higher than the property is worth. I based my testimony

en commercial transactions in the city.

In sections 33 and 34, we had a good many transactions with reference to land, not only in acquiring rights of way, but also in reference to riparian rights, along Carp River. The Negaunee mine drains the water which is pumped from the mine into a small stream which flows into Carp River, and it has caused that river to overflow on some of these descriptions; the owners have asserted very high values on that land, and we have paid quite large sums, by reason of those claims, and to acquire the right to continue flooding in the future. We did not buy a foot of the land; we simply purchased the right to flow the water from the Negaunee mine through those streams. It is only occasionally that it would overflow. They are using it for farming purposes right along. This situation took the water from the Negaunee mine through the nearest established water course.

There have been no recent transactions in the territory on sections 26, 27 and 28. I do not know of any other sales on sections 33, 34 or 35, except as is covered by my former testimony, nor any sales on sections 2, 3 and 4 of 47-26, except as covered in my former testimony with reference to section 4. I do not know of any sales on those

nine sections between individuals, although there may have
been small sales there. That property is practically all held
by mining companies. It is their policy not to sell the land;
they lease it. The Cleveland Cliffs Iron Co. is holding its land with

reference to future value. It is not for sale.

I know of no sales opposite description 39 between individuals. If there have been sales between farmers a further distance away, I have not those in mind, and have not used them as any basis for my testimony. I have used as such basis the sales to mining company, to the city of Negaunee, the contemplated sale to the South Shore, and the purchase of the water rights along Carp River. I think I would make the value of \$500 an acre exclusive of the element of suitability for railroad purposes, although I stated that I used that element in my former testimony. The Iron Cliffs Co., a corporation the stock of which is owned by the C. C. I. Co., purchased section 35 at least four years ago. I do not know how the assessed valuation by the Tax Commission was obtained. I do not know what was paid for section 35. I didn't have reference to the price paid for this land, in fixing my value on item 39.

Item 41 lies in sections 33 and 34, 48-26. My value on that was placed on the same considerations as on 39, grouping all the considerations I have mentioned. As you come further west, you approach the mineral formation, where you have an added element of value. The \$250 additional per acre on this tract is due, to a certain extent, to the fact that you are approaching the locality where there is a possibility of ore values, and to the general character of the land. It is nearer the city of Negaunee, and nearer the mineral formation, and for both these reasons I think it more valuable than the land at Eagle Mills. There is no ore body known that lays as far east as that. The west end of parcel 41 is almost adjoining what I paid over \$1,000 an acre for, for just surface, on condemnation proceedings by the L. S. & I. to build our track to the Negaunee mine. Less than one

345 forty from the west end of this parcel, the jury in 1911 fixed the surface value at \$1,000 an acre.

I undertook to prove that those valuations were too high, but I pever convinced anybody of it, either in condemnation proceedings or in purchases from private parties. We attempted to prove values at \$100 to \$500 an acre, as I remember it. There is a remote possibility

of some mineral in this locality.

The sections through which item 42 runs is described in my former testimony. The \$5,000 territory extended from the southeast corner of 33-48-26 to the center of section 6-47-26. We paid \$5,000 for all except a small portion in the Negaunee mine property, on section 5. The purchase of that territory was based upon a commercial value of that surface for building purposes; that was the ground the owners took in putting that price on it, that this was the only territory available for building homes for the men who would live at the Lucky Star, Athens and other new mines about to be opened at Negaunee, and that this land had an actual value for such purposes, irrespective of railroad use or anything else.

There are some scattering houses down that valley; no new ones

since the track was put through; they are just sinking the shafts at the Lucky Star and Athens mines, and have not opened them up for shipment as yet. In locating this 2.6 miles, they selected the site regarded as least likely to affect the ore body, and a permanent right of way was given, so that the use of the railroad would never be interrupted. There is no known ore under this tract, but a great deal more than a possibility of ore. This district, as you come further west, enters the known ore formation, where there are working mines on both sides of the right of way, and it is quite different from the

one you were asking me about a moment ago.

346 I do not base the value of this tract entirely upon the purchase which was made of the particular land itself. price of \$5,000 per acre has been asked and paid in that vicinity for at least 5 years and more last past, for railroad purposes, and in purchases of this character in that vicinity it would not be fair to apply to the price we paid the statement in my former testimony that we were often obliged to pay from 2 to 3 times more than the other value of the land when we were purchasing it for railroad purposes. This is the price which is put on that land and for which it is held. If you wanted to buy it for any purpose, I don't think you could get it at any lower price. It is all owned by mining companies or parties interested in the ownership of mining lands. None of it has change l hands within 5 or 10 years, except this strip and except in adjusting boundary lines or ownerships, or something like that. When I gave my testimony before, I had not informed myself as fully as I might have done, and, in reading over my testimony since, I notice the various things in which I thought it ought to be modified or change I or corrected in the way I have now done at this hearing. I gave what I thought was my best judgment at the time. It was not as mature in some respects as it was when I considered it afterwards.

To item 43 I have added \$4,000 an acre to my previous testimony. The tract runs from the center of section 6 up to about the location of the depot property. I have affected this value with the present use of the adjoining parcels, without attempting to add anything to that valuation by reason of the fact that the railroad has what we call a permanent right of way at this point. I think that gives it an additional value, but I haven't attempted to appraise that. The lots are all sold subject to a reservation of the minerals. Some of the deeds have caving clauses, and some have not. All present sales are made

by deeds which would enable the mining company to secure the removal. Our companies will not sell any lots in that portion of Negaunee at any price; we simply lease them, under leases which fully protect mining rights and give the right to take possession.

Adjacent to item 43, the mineral estate is all owned by mining companies. The business property and surface is owned chiefly by individuals. Some of the lots are owned by the mining companies, which they will not sell at any price; some of the mining company lots are vacant and some occupied. I don't think of but one vacant lot owned by an individual. Near item 43, within the last few years, there has been erected the new fire hall of the city, right up Division

St., less than one block from this right of way. Across Division St., on the corner of that and Iron St., there has been a new two-story frame building erected—a business block. Right opposite the point where the right of way crosses the C. & N. W., the Negaunee State Pank has put up a very nice two-story brick building. The buildings I have mentioned are all within a block on the northerly side of this right of way. This is right opposite the best part of the business section of Negaunee. In the event of the removal of Negaunee, these new buildings will have to go. There are no present plans for moving Negaunee, and it will not be for a long time.

There has been no sales nearer than a block from the right of way; there have been, so far as I know, only these few sales that I have mentioned. In the values I fixed today, I have not used sales and transactions between individuals very much, to fix prices. I have made inquiry as to such sales as I could find out about at Negaunee, but

there have been very few transactions between individuals.

The value fixed on the \$24,000 an acre portion of item 46½ was due to its location near the C. & N. W., which adjoins the D. S. S. & A. on the south, and to its location near the important business streets of the town. It is bounded on the west by First St., on the east by Second St., and on the south by the right of way and station grounds of the C. & N. W. Ry., and it is practically in the same block as the new postoffice site. There is a possibility of considerations affecting a parcel of property that would not affect the parcel adjacent to it or adjacent to the one affected.

When I divided 46½, the considerations which surrounded the specific tract on which I placed a value, double the other, are important, in my judgment, in determining what the value of that specific tract will be. In valuing item 43, I have considered the valuation of this right of way as if the railroad did not exist there any longer, and that the land included in the right of way would be naturally and immediately included in this platted portion of the town and be suitable for business and building purposes, like the rest of the city. To have the South Shore away would improve the value between the street intermediate Iron St. and the railroad. I took all those things into considerations, and thought that the price which I put on it would be a fair present value of the property. I considered the property just as it is.

With the few exceptions I have mentioned it is practically impossible to give you sales or commercial transactions through this mining territory. My judgment is based upon all the elements mentioned in my former testimony and this morning, including the commercial value, the assessed value, the possibility for railroad use, and the relation to the ore, taking into consideration the conditions of mining, and everything of that character. Another man, of the same ability, integrity and knowledge as myself, might hold an

entirely different opinion. I would be surprised if another expert on land values varied as much from my last figure as I did between my first of \$5,000 and last figures of \$9,000, if he took into consideration the same facts and circumstances that I have, and the same elements of value. I don't know any mathe-

matical calculation that you can apply in determining value of any property; all value is matter of opinion. My opinion is that in order to purchase the property a man would have to pay the values I

have given.

I do not think there is anything strange in the fact that one-half of item 46½ should be worth twice what the other parcel is, considering its location and surrounding. If, instead of generalizing on a strip of right of way several miles long, we had gone in and taken the specific parcels and placed a value on them, we might have come out at a different result, but I have not been just guessing wildly here. I have considered with the utmost care, and in detail, these rights of way where I have put these high valuations; I have taken the trouble to go out on the right of way, personally, and see what use could be made of this land, if there wasn't any railroad there; just assuming it was ordinary commercial property, and see how this right of way would fit up with the lots from which it was taken, and the uses which would be made of this property in connection with adjoining property; I have based my value upon such consideration as that.

I have not been generalizing on long stretches of rights of way with the exception of that ten miles west of Ishpeming, where I said it was worth, in my judgment, at least \$100 an acre, basing that upon our experience in acquiring parallel line. I have not refined the other descriptions as closely as I have refined 46½, but I can, if you wish. I can go on west from that and cover the next mileage, or I can go back to Negaunee, where I have put that high price, and tell you who owns the adjoining property and what it is used for,

and how this right of way would be available and valuable if
the railroad were not there. Where I said \$3,500 on the
South line, running from Eagle Mills over to the Harvey lots,
we paid in that vicinity as high as \$5,000 an acre for rights of way,
and over at the east end we have paid a good deal less. I took all
of that into consideration, and struck an average of \$3,500. All

that was on purchases, not condemnation proceedings.

In my previous testimony, I fixed a value of \$5,000 an acre on item 44, now valued at \$12,000, with the statement that the eastern end of it was worth more. In reading over my testimony after it was written out, that was one of the parcels which attracted my attention as not having been valued at quite as much as it should have been, and I suggested to Mr. Eldredge that I wanted to raise that and to lower one or two others. My value was fixed by running the character of the plat of the adjacent territory through that and estimating on the basis of lots and considering the value of those lots for commercial purposes, like other property.

I have not at any time this morning intended to use the expression of suitability for railroad use as enhancing the value of any of the parcels which I have mentioned. I used the term more as descriptive, and perhaps ought not to have used it at all, but the values which I have given on all of these parcels have been based on my opinion and judgment of the commercial value of the property, regardless of railroad use. I formed the opinion that this railroad

proper'y would have a value based upon the value of similar prop-

crty in the vicinity of the right of way, or contiguous to it.

I think the railroad property in parcel 44 would be more valuable than the land south of the right of way, and substantially the same as the land on the north. One side is business blocks, hotel and various places of business, and the other vacant land and a sort of

A portion of the land on the south side would be good business property. There is a warehouse or two there, and 351 then after you cross the street you encounter a bluff and rough broken land, not valuable for building purposes. The land north of the railroad is built up solid, and in arriving at its value I have taken into consideration the value of that property, as well as

I could determine it.

I have had dealings with the occupants of probably half of the lots, starting with the Collin's house, where Iron St. and the railroad right of way converge, and running easterly to the hotel by the passenger depot; we have not bought or sold any of those lots. That land is valuable. It was acquired by the Jackson Iron Co. in the fifties, and they have never parted title with that land from that

time to this, but have leased the surface.

These buildings I am speaking of front on Iron street, the main street of the city, which runs parallel with this right of way, and the rear of those buildings back up to this right of way. I have had dealings on account of some ambiguity in those titles. We haven't bought or sold, but have paid considerable sums of money in there. to straighten out difficulties of that kind. I don't think of a single sale in there. I have taken into consideration the rental value of property there, and its location, which is parallel to the main business street of the city, and the prices which have been paid for business lots around the city.

I purchased some lots for the school district, further up town than this, not over four blocks from parcel 43, and a little farther from 44. There we paid prices very much higher than anything I have given We began a condemnation suit, and it was settled amicably afterward, but the price per lot paid was very high. In my former testimony, I had taken the basis of \$2,000 a lot, ex lots to the acre. When I came back and read in the heart of the city of Ishpeming.

this testimony and found that I had placed a great deal lower value on this stretch through the business section of 352 Negaunee, I thought it a mistake, as property was worth, in

every respect, as much as the property at Ishpeming; land values at Negaunee have, on the whole, been rather higher than at Ishpeming.

I made my calculation, to begin with, at Ishpereing, basing it upon certain transactions where prices had been both higher and lower than that, and adopting that as a fair average value for this property right in the heart of the business section of the town, and then I applied that to Negaunee, because experience has shown us that land values in Negaunce are quite as high as, if not higher than, at Ishpeming. In fixing the \$2,000 lot value, I had the sales in Negaunee of which I have told you, the school property, the railroad

rights of way, and purchase of lots in connection with mining prop-

erty.

Since I was here before, certain lots on Main St., in Negaunee, have been sold at higher than the \$2,000 a lot I am talking about. Main St. runs parallel with the right of way. Those lots would be opposite the westerly end of the 2.6 miles of new right of way. They took the title subject to mineral reservations.

Going back, farther east, A. Maitland is platting lots on the back end of his property, away from Main St., and fronting on what now constitutes a part of the abandoned right of way shown on Complt.'s Ex. 15. He has sold some of those lots at varying, but substantial,

lot prices, with mineral reservation.

I would not say that I based my valuation of Negaunee property upon the valuation in Ishpeming. I simply mean to say that land values in Negaunee are probably higher than in Ishpeming, the reason for that being that there are now being opened in the vicinity

353 of Negaunee several new mines; there are three big shafts being sunk on the easterly side of Negaunee at present and others south. That will bring hundreds of additional miners to Negaunee with their families, and will call for the building of homes; that is the present need for building property that I had in mind when I was speaking of the high value for commercial purposes of the land along this right of way east, all the way down to Eagle Mills. That is the only direction in which the town can grow, and the territory along that, adjacent to it, will have a high commercial value for that purpose. The population of Negaunee is about 8,000

and Ishpeming about 12,000.

My reference to the removal of Negaunee is entirely a remote prospect, and the building of homes for the men to employ in these new mines is a present prospect. It may be that this generation will not see any change in Negaunee, so far as its removal is concerned. I did not intend to say that the Eagle Mills land had a future value of 400% on account of the removal at Negaunee. I mention that as something affecting its future value, but the thing which bears immediately upon this value, and the value of all the land easterly along the line of this railroad, is the opening of these new mines, and, while I may have discounted the future quite a ways in putting those values down at Eagle Mills, I think, if you take into consideration the immediate prospect for building there, that the valuations were reasonable. If we were to consider it from the standpoint of what it would cost to acquire a right of way, I wouldn't for a moment be understood as saying that you could get a new right of way through this territory for any such amounts as I have given.

I would feel absolutely certain that it would be beyond possibility for any railroad company to condemn a permanent right of way across this mineral formation, through the heart of Negaunee,

354 for any such price. Taking into consideration the location of known operating mines and mines being opened up, there isn't any other feasible right of way into Negaunee. I have made no computation to figure up what my valuation will amount to for the whole right of way. I realize that there is a limit to land values

beyond which a passenger road would not enter the territory to serve 20,000 people. That limit has not been reached in the figures here. I know that the figures I am giving are just what railroads have been paying to get in for all service. There is a limit beyond which it would not pay to expend money, but, as applied to these towns, they constitute a part of a large district where the business is of enormous value; the railroad wants to get in to serve the whole business. I am not attempting to divide my values on any basis of part

passenger and part freight,

I have been in Ishpeming since May 1, 1903. Land values have gone up in that time; there have been very material developments, in a mineral way, in that district since then, and that general tendency has affected the entire district, because the prosperity of that district depends entirely upon a single industry, and the discovery of a new mine of iron ore helps to guarantee the permanency of the town and the employment of labor there, helps property values, and makes the prospect of additional mineral less remote. Mining men and railroad men in general have a conception of considerably higher values for land in and around Negaunee and Ishpeming than they did when I came there. The State has estimated a life for our mines of fourteen or fifteen years, and experience has shown that new bodies of ore are opened up from time to time, so that this district is still shipping at practically its maximum. Ishpeming and Negaunee have no other industry, and the future of those places depends upon the prosperity of the mines.

I fixed the value of Item 45 by the fact that it crosses, for a little more than a mile of the distance, section 1 of the Jackson Iron Co., where we purchased property for railroad purposes, and it also has the great element of value of the character of the title. The mineral value entered into this particular tract. In the values which I have placed upon land between Negaunee and Ishpeming which is not built up. I have taken into consideration the value of this permanent right of way to the railway company over a mineral

formation practically all the way.

I cannot say that there are known ore bodies actually disclosed by drilling all the way from Negaunee to Ishpeming, but there are very strong mineral prospects. Rights of way are guarded by the Mining companies with the same degree of care as they would be if the metal was known to be there. A right of way is not an encumbrance alone because it occupies a strip of land which may be fifty or one hundred feet wide, but also because if ore is ever found it may tie up operations for a great width each side of that right of way, to preserve the right of way from caving. I don't know any known ore bodies that have been opened up by drilling along or under this parcel of land. There are no opened mines between Negaunee and Ishpeming. The State Board put high values on every description around Ishpeming and Negaunee that had any iron ore on or near it.

Without the presence of mineral or mineral prospect, the value of parcel 45 would be considerably less, probably in this particular piece of right of way more than in any other. There isn't very much building along this tract; a few miners' houses and gardens along it.

There is a little brush on some of it. The difference in the value of this tract and of item 46 is what I thought you would give to the mineral element of the right of way. Whereever a right of way is

on what is commonly called the soft ore formation, where the surface is likely to be caved, this element of value is very 356 much greater than when you reach the hard ore formation, where the caving process is not used. There, mining operations may continue, as in Ishpeming, underneath it without interruption.

Parcel 46 starts out by Union Park, in vacant land, and runs right into the city of Ishpeming, extending almost to the depot, so that the west end adjoins warehouses and lumber yards, and some residences. Property of that kind in Ishpeming would be quite valuable, and I thought \$5,000 an acre a fair value. Here, I am getting more into the question of the commercial value of the property, as distinguished from this element of mineral value, I would fix a higher value on the west end than on the east end of that strip. When I testified before, I put a value on the east end of \$3,500 an acre, and I think that would be a fair statement now, and make it enough higher on the west end to strike this average of \$5,000 an acre. would bring \$3,500 value for about one-half of the way. In my former testimony I had the value of the west end at \$7,500 an acre, and the east at \$3,500.

In fixing my values on Item 461/2, I based them on specific sales There have been a few sales of vacant lots within a only in part. block or two of that location. The most recent is the sale of a number of lots, in the block immediately south, on the other side of the C. & N. W. right of way, to the Government, for a postoffice. I know nothing about the price, except what I have read, but the newspapers stated the consideration at \$12,000. That value is somewhat less than I have placed on this property. The property in that immediate locality on the south side of the C. & N. W. right of way is, in my opinion, of considerably less value than these lots of which we

are speaking.

Going over to Main St., on the corner of Main and Barnum Sts., the city bought a vacant lot and a half there, for a library 357 site, some years ago. My knowledge of the purchase price is what I have read in the papers. I think it was \$5,000 for about one lot, a block or so back from the business part, with nothing but houses all around it; but it is on a good corner. It is a lot and a half of the Excelsior Add., where the lots run about eight to the acre. I have taken that lot into consideration, and also the high rental value of property adjoining the South Shore right of way immediately west of First St. If there wasn't any South Shore railroad in Ishpeming, and we took this property into consideration only for its business and commercial purposes, that particular parcel, which I have defined as the southerly parcel here, would, in my opinion, be worth the price I have fixed. It has not been true there that parcels lying next to a railroad are worth less than those back a little distance. If you go one block to the west, where you come to Main St., the Miners National Bank and the Jenks Block, which contain two of the most important stores in Ishpeming, adjoin the right of way-the rear comes up to it.

On the next property to the east, the building is occupied by Carpenter Cook Co., wholesale grocers, and the fact that there is a side track of the C. & N. W. right at their rear door is of value to them. The next building is occupied by Swift & Co., wholesale meat house, in the same way, with a side track, and you might go right along the same way. Those locations are valuable, and are sought by business houses. In fixing the \$12,000 valuation, I considered the same specific sales and the general situation of that property.

That portion of parcel 47 between First and Main Sts. is immediately in the rear of a very narrow strip of land. If the railroad were gone, all of this additional territory would fit right on to those short lots, and piece them out, and make them big enough so that substan-

tial buildings could be put there, instead of small buildings, as at present. Now, it is all built up with small buildings that rent for very high rental, considering the almost temporary

character of the buildings.

In fixing the value of the north part of item 461/2, I took into consideration the sales in Ishpeming mentioned, but I don't think you can figure out the value of any piece of property exactly or mathematically by reference to what something else sold for. I think each parcel must be determined according to its own particular facts and circumstances. While I refer to these other transactions as constituting some guide as to value, I think we must look at the property and see what it can be used for, and the use of surrounding property. My judgment there has induced the difference between the \$12,000 and the \$24,000 part of that parcel, rather than the application of one set of sales to one part of it, and another set of sales to another part. Having reference to sales, it was my judgment that \$12,000 was enough for the north part of that description. Referring to those same sales, and taking into consideration, in addition, the location, and my knowledge of conditions, I thought \$24,000 was fair for the south part,

In fixing the value on item 47, I went over this right of way again, having in mind particularly the questions asked me before. Starting from First St., west to Main, that portion of this parcel would fit right into the lots which front on Canda Street. This right of way between Main Street and Pine is extremely well located. On the east, it would front on the main business street of the town; on the south it would adjoin the C. & N. W. right of way, a portion of which is vacant there, and would make the most admirable location for warehouses or business houses. I am not considering any severance damage at all. I am considering what we would do with this property if the Railroad were not there, and I think that from First

Street over to at least the middle of the block between Main and Pine it would have more than the value of \$2,000 per lot that I have put on it. From the middle of the block, between Main and Pine, and extending west for the remainder of the parcel, it would have less value, because there it goes through some rocks, and perhaps that would lessen its value on the north side; but I think that the valuation I have placed on that parcel as a whole is a fair average valuation. That takes into consideration that, all

along this portion of the right of way, on the other side of the C. & N. W. right of way, it is built up solid by business houses that back

right up to the line of the right of way.

In Item 48, I still include a mineral value on the east end. On the easterly end, if there is mineral there, it is a part of the hard ore formation, and that element of mineral value doesn't exist to the high degree that I gave in my previous testimony. But, on the westerly end, you strike into the soft ore formation again, and, considering the value of the easterly end for commercial purposes, which is still in the built-up part of the town, and the mineral value on the westerly end, \$2,500 an acre would be a fair average valuation. The first part of this parcel, starting from the east, would have quite a substantial value for commercial purposes; then you strike a stretch, through the swamp, of much lower value, and then on the west you would come to what appears on the map as soft ore formation. I would go down as low as \$500 an acre in the cheapest part of the right of way.

On the east end west of the yard and right of way, it is all houses, residences of miners. The land belongs to the mining company. Many of the houses are owned by other people. All our leases to employees are made on a low annual rental of, perhaps, \$20 a year, and they pay the taxes. The lease will be for twenty years on some of those

additions, subject only to mining necessities. Our standard form of lease is twenty years, subject to removal in case ore is discovered and it is necessary to open a mine. Many of the lots run \$25 or \$30 in taxes, making the total payments for the year not over \$50 for a lot. The mineral, under the new law, is assessed separately, or else included in the value of the adjoining working mines. I have known of lots selling to miners for \$500 or \$600 a lot, but the locations which are occupied by miners are re-

mote from the business section.

My figure of \$100 an acre on Item 49 is an average, and a generalization. Some of it might go as low as \$25, and some of it up to \$200. I am basing my judgment quite largely on the average cost we paid on seven miles of right of way paralleling it. We actually paid a little better than \$100 an acre on a right of way with deeds that the mining company can require the railroad to get off on nine months' notice. It is in a possible mineral location, but outside of anything that I have a definite knowledge of. Opposite this item 49, I did not base any of my judgment on sales, except the purchases of the railroad company. It is a mineral district, and there are no sales there.

Much of my testimony with regard to values is based upon my experience in purchasing lands for the L. S. & I. I might say of this, and of all these parcels, that I have based my opinion upon our experience in all these lines as I have outlined it in my testimony, and the considerations which I have mentioned on the parcels about which I have been asked would apply equally to the other parcels on the south line about which you have not asked. On the south line, there have been very few transactions between individuals, if any. There are no sales or present settlements of home sites. This

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whole district is peculiar in its high land value, but it is easily understood when you consider that it is a mineral country, that the principal industry is mining, and that it can, in a large part

of this territory, be carried on only by caving the surface, and that has added, across these vacant lands, a great element of value to this right of way, which this company acquired years ago.

I don't know anything about the original cost of any of this, except the 2.6 miles, of which I had charge of acquiring under the contract between the C. C. I. Co. and the D. S. S. & A. Way over at Eagle Mills, there was some of that 2.6 miles that would go lower than \$1,800, but it is my best recollection that there was no part of that right of way that we acquired at anything like as low as \$500 an acre.

On August 26, 1912.

CHARLES V. R. TOWNSEND, a Witness called by Plaintiff.

Direct examination.

By Mr. Eldredge:

I live at Negaunee. I am, and have for 8 years been, agent for Cleveland Cliffs Iron Co.; am Land Commissioner for L. S. & I. and M. & S. E. railroads. For 8 years, I have been buying and selling lands in Upper Peninsula counties of Chippewa, Mackinaw, Luce, Schoolcraft, Alger, Marquette, Baraga and Ontonagon.

TOWNSEND.

Cross-examination.

By Mr. Wykes:

Through the territory covered by my testimony, the demand, and actual sale of land without timber to settlers, has been very large; it is rapidly settling. In the Alger district, there are very large settlements going on; in Schoolcraft, at Seney, the Western Lands Security Co. has sold a very large acreage at very good prices. The company is doing the draining. In Chippewa, I sold a very large acreage of land, without timber, last year to settlers. Luce county, south of South Shore, particularly Lakefield township, is settling very fast; that is splendid farming country—splendid farming communities.

I represented Jackson Iron Co. in a sale of right of way to C. & N. W. in Negaunee 3 years ago, being 1.44 acres; this was from the station ground west to what was called the diamond crossing. The consideration was \$2,500 for 1.44 acres, with a provision that we can cave the track and put them off any time.

Q. Didn't you testify, on June 1, 1911, to a sale of acreage in the city of Negaunee, as agent for the Cleveland Cliffs or L. S. &
363 I., to the C. & N. W., of land between the new depot and the diamond crossing, right over the Jackson mineral body, 3

acres, and say, in answer to the question, "How much did they pay for it?" "A. They paid us at the rate of about \$700 an acre, land that could all be platted, it could all be used for residence purposes, water and sewer; I have figured six lots to the acre."

A. That is in that condemnation? Q. That is in the Barassa.

A. In the Barassa, now you may be right on that acreage, and, just as I testify, we sold them that, we will put it at seven hundred dollars an acre, but I don't think that acreage is right, but we gave them an easement for a single track road, which we can put them off at any time that we need the ground. We don't agree to give them another right of way. \$2,500 is the consideration they paid us.

I gave testimony regarding the value of Barassa tract: I testified that Barassa tract was worth \$100 an acre, with the same value for

the Martel and Marketti tracts.

Q. And upon what did you base your judgment of \$100?

A. I simply thought that the land was low and was not available, under the conditions that then existed, for any-or did I take into consideration the fact, which has developed in the meantime, that those new mines would require land for streets and building purposes; my judgment of \$100 an acre which I gave there as my judgment was very quickly upset by a jury of my townsmen.

The Master: What was the date of that?

Mr. Wykes: This was the 13th day of April, 1911. And, in answer to a question of what sales you fixed your value upon, 364 did you not refer to a tract in that neighborhood that you said was purchased of a man by the name of Muck?

Q. And did you not say that a forty acre tract there was purchased at-I have forgotten what the figure was-a certain figure, what was it?

A. I believe I also testified in the Muck case that we bought a defective title.

Q. You had better see this, before you say that.

A. From Muck? Just a quit claim from Muck, paid him \$1,500, as I remember.

Q. What was it you testified with regard to the Muck description?

Mr. Eldredge: Show him the testimony.

Q. You have said that you stated— A. No, I said I believe I stated.

Q. Now, isn't it a fact that instead of stating, you were approached on cross examination with the idea that this was a defective title that you had purchased, and you said that it was a good title and a title conveyed by warranty deed?

A. No, not from Muck, I couldn't; if I did, I must have been very

much mistaken.

Q. Let me read this testimony to you: "Q. Upon what do you base your opinion then when you say that the Barassa property is worth two hundred dollars an acre and the Martel property \$100 an acre and the Marketti property at the price you put upon it? A. Properties that I have bought right adjoining. Q. How long ago?

A. Within two years. Q. Where was that piece located? A. Right to the north of the Barassa and Martel lands. Q. How far north? A. Directly adjoining. Q. You bought a 365

tax title? A. We got the title."

A. We got the title, which the court afterwards affirmed. We did have—at that time we didn't buy from Muck. As I remember it, he gave us a warranty deed; of course, we knew Muck wasn't responsible,

and couldn't warranty anything.

Q. Let me read a little further. "Q. By whom owned? A. By Charles Muck; we paid a thousand dollars for forty acres. Q. What title did Mr. Muck have to it? A. He had a title which was approved by our counsel. Q. Are you not in litigation on that title at the present time? A. Yes. Q. You brought a lawsuit? A. Well the other fellows brought the lawsuit." Let me read further, and ask if you gave this testimony: "Q. You understand you are basing your testimony on the value of the land as it is today. Now as to the price today considering these values and the circumstances surrounding that land, upon what do you base your opinions? A. Only yesterday we had an offer of forty acres good hay land. Q. Where? A. Two forties east of the Martels on section 34 at one thousand dollars." That is correct, isn't it?

A. Yes.

Q. Did you buy that land? A. No.

Q. Didn't think it worth a thousand dollars?

A. Couldn't get a title.

Q. You didn't tell that to Mr. Barassa, when he was examining you.

A. No. That was just yesterday, wasn't it, I said there-

Q. Only yesterday.

A. That was the offer; then it takes time to look it up, and 366 our counsel wouldn't approve it.

Q. What were those descriptions?

A. Well, I can't tell you now. Q. Who owned the lands?

A. I can't tell you.

Q. Can you give us the descriptions generally—what part of the

section they were in?

A. Just in a general way; that was either the south half of the southeast quarter of 33, as I remember it, or the south half of the southwest quarter of 34.

Q. Do you remember the names of the people?

A. No, I do not.

Q. Was the acreage of this parcel that was sold to the C. & N. W. three acres.

A. As I took it off the copy of the deed this morning, I only made

it 1.44. Q. Here in your testimony you say you figured it six lots to the acre. How did you figure that up? You bought a certain number of lots there?

A. We take a lot, call a lot fifty by a hundred and fifty, 750 square feet to a lot.

Mr. Butler: 7,500.

A. I mean 7,500, and we buy six; that is practically an acre of ground-practically forty-three hundred thousand feet.

Q. From your testimony here, you evidently figured the number

of lots there and figured it into acres?

A. Yes, take the lots fifty by a hundred and fifty. Q. And this was very soon after you had had the trans-367 action?

A. Yes, a year or so.

Q. And your recollection of that would have been better at that time than now, wouldn't it?

A. Yes.

Q. Do you remember having stated at that time that there were other lands for sale in the vicinity of Negaunee?

A. Yes.

Q. Whose were those?

A. George Maas and Mitchell.

Q. Where were those lands?
A. They were north of the Maas mine.

Q. And how far this way from the center of town?

Mr. Eldredge: This way?
Q. Wouldn't it be this way?
A. Yes, it would be northeast.

Q. Northeast from the center of Negaunee?

A. Yes, a mile and a half.
Q. Those lands were divided into lots, were they?

A. No, it is acreage property.

Q. You had that for sale, did you? A. No, had an option on it. Q. You had an option at the time?

A. Yes.

Q. Were they sold?

A. No, we didn't exercise our option.

[Folio 368 missing.—Printer.]

369 Ishpeming is the surface. The minerals are always reserved.

TOWNSEND.

Cross-examination.

By Mr. Wykes:

In Negaunee, the business part of the town lies north of the right of way, which is the present south limit of the business part of town. The business buildings abut the track there. The sales in the business part on which I based my values are north of the railroad, some abutting the railroad. For four lots on Pioneer Ave., the west side abutting the South Shore track, there has been an offer of \$2,500 a lot, 33 x 100 feet. That involved the right to put and maintain

permanent structures on the ground, with a removal clause in case of the finding and necessity of mining iron ore. I don't want to tell

who offered that.

Four years ago, I had an option on a lot on the corner of Pioneer and Iron Sts., 50 x 100, for \$4,500, for a Y. M. C. A. building. The owner said he was donating \$500 to the Y. M. C. A. His estate sold the lot for \$4,300 cash, with no structures. Iron is a main business street of the town, and Pioneer is a principal business street. At that time, this lot was four blocks from the postoffice; now it is within a block. We did not take up the option. The lot was sold about 3 years ago, and a concrete block put on it. Our lots are between that and the track, 400 feet. The entire property on those main streets is built up for a considerable distance; starting at the corner of Pioneer and Iron Sts., north, the business part runs about 3 blocks. It does not run farther east than Pioneer St., and runs west, about five blocks, to where the South Shore intersects Iron St.

The new building put on the lot, corner of Pioneer and Iron, cost, perhaps, \$15,000. The bank block on Iron St., 1½ blocks 370 west, cost \$40,000; the Perkins Block, in the second block

from this, cost \$30,000; the First National Bank Bldg., two blocks away, cost \$40,000. The old bank building, burned, was on the south side of Iron St., next to C. & N. W. main line. After the building burned, the property, with a small lot adjacent, was sold for \$13,000, to a new state bank, the land being the equivalent of two lots 50 x 150 feet. The bank did not stay there, because the other side of the street, away from the railroad, is the most desirable.

I also had in mind the sale of some unimproved lots opposite this old bank property, on the south side of Iron St., between Silver St. and the C. & N. W. main line. It was bought 2 years ago, by Winter & Suess, for \$2,250. It is about 125 feet on Silver St., and triangular, running from 100 feet in depth to 25. Next to the South Shore track, it is 18 to 20 feet. At the furtherest extremity north, below

the surface of Silver St., it is perhaps 8 feet.

I base this value on no other lots that are in that immediate vicinity; there is no property for sale. Those I mentioned constitute the sole basis of my value, as far as actual sales are concerned. With the unfortunate conditions surrounding property in Negaunee, with reference both to dwellings and business places, there is no property for sale. It is not a question of the actual merit as to the value of the property there. If there is property for sale, you can get most anything you want to ask. In the absence of a knowledge of sales, I can form a judgment as to the value of the property only so far as I am in constant touch with people desiring vacant places for residences, stores and offices. My judgment is based on what the property can be sold for.

I based my \$18,000 to \$22,000 valuation on my general knowledge of the conditions in Negaunee. I took into consideration specific bids and offers, beside the one I mentioned. I considered the

offers for these lots between the Mitchell lot and the right of way as bona fide.

On July 21, 1914.

Townsend, Recalled by Plaintiff.

Direct examination.

By Mr. Eldredge:

(Certain testimony of Ralph J. MacKenzie, to the effect that Mr. Townsend had offered to sell certain lands in Negaunee Township to him at \$3.25 to \$6.00 an acre, read to witness.) Mr. MacKenzie never made an application personally or by letter, to my knowledge, for the purchase or rental of any land. We never made any offer to MacKenzie or anyone else for sale of any land in the Eagle Mills flat or its vicinity. The Cleveland Cliffs Iron Co. owns 400 acres on the Eagle Mills flat, near Eagle Mills, being right around the Eagle Mills connection of L. S. & I. and D. S. S. & A. These lands are located in section 34, 48-26; for several descriptions, we paid \$30 an acre, and for the balance \$50; they are not for sale.

I never told MacKenzie, in any form, that I would sell any land of Cleveland Cliffs Co. at Eagle Mills, or between there and Goose Lake, or anywhere on Eagle Mills flat, at from \$6.50 to \$3.50 an acre and be glad to sell them. I had never had conversation with him on the subject of sale or rent. MacKenzie came to my office about a year ago, April 1913, said he was supervisor of Negaunee Township, and asked if we were satisfied with the previous year's assessment; I told him "yes." That conversation did not exceed three minutes, and that was all, relative to lands, that took place, to my

recollection.

TOWNSEND.

Cross-examination.

By Mr. Wykes:

MacKenzie never came to see me about any Cleveland Cliffs lands, except this one instance, and nothing was said at that time about the purchase of lands or as to what lands were worth; the lands appear on the assessment roll at from \$3.00 to \$25.00

per acre.

The 400 acres in section 34 is in part cut by the South Shore, which runs through three forties; and the others lie directly north. It is practically all cleared land, with no timber of value; the company purchased it about five years ago, in two parcels, one at \$30, and the other at \$50, per acre. One parcel included lands remote from Eagle Mills. The minerals were reserved. A half mile west of Eagle Mills, the Cleveland Cliffs owns a forty, having paid a thousand dollars for it and buying a lawsuit; I previously testified relative to this. It was the Maloney forty. We wanted the Eagle Mills lands for possibly a townsite purpose. The 400 acres run right up to the point

where the lines intersect at Eagle Mills. In the first two miles east from Eagle Mills, the Cleveland Cliffs owns nothing. East of there, along the north track, it owns approximately 200 acres. From two miles east of Eagle Mills, towards Marquette, the Cleveland Cliffs has large holdings; except for flowage rights of a small part, in connection with the Carp River Water Power, they are put to no use at pres-The 400 acres at Eagle Mills was assessed for 1913 at \$6.25 to \$11.25 per acre.

373

On September 30, 1912.

WILLIAM E. MASON, a Witness called by Plaintiff.

Cross-examination.

By Mr. Wykes:

I have been local attorney for South Shore at L'Anse for a considerable time. Values along the road are increasing, and are consid-

erably higher than 5 or 10 years ago.

There is land between red lines on Complt.'s Ex. 10, Riggs, not covered by tracks. The greatest distance between the red lines is about 1,200 feet; at that place, there are three tracks, a roundhouse, old depot grounds and a pole yard. At the lower part, toward the west, it is 1,000 feet between the red lines, and there are two tracks. The railroad uses the land for storage ground for forest products towed in along the old ore dock. The National Pole Co., the Nester Lumber Co. and others use that ground to store lumber, poles and bark, for shipment. I don't know whether they pay rent or not.

The old dock was rebuilt by village, under lease from South Shore. There are no tracks on the new docks, but are on old. To the south of the railroad grounds, on Complt.'s Ex. 10, there is no settlement; it is a forest plateau. I have owned it for a year; I paid \$60,000 for entire tract, which consists of 160 acres immediately south of track, 400 or 500 acres of wild land a couple of miles back, from which the timber has been removed, and about 42 vacant village lots. farther back is fair farming land, worth \$15 to \$20 an acre. lots are 50 x 125 feet, and all in settled part of L'Anse; two are down in the flat and the balance on hills where residences are.

The lots are farther away from the settled part than the irregular tract devoted to railroad use. The two lots in the plat are in the business part, a store on one side and county buildings on the

other, and are among the best in the city.

374 There has been a gradual increase in values in Baraga. There has been a rapid increase in farming settlements along this part of the railroad in the last 3 or 4 years.

375

On September 30, 1912.

Joseph J. O'Connor, a Witness called by Plaintiff.

Direct examination.

By Mr. Eldredge:

The Blankenhorn farm, 60 acres of cleared land, is about 1 mile from the center of town; it sold several years ago for \$8,000. Values have increased, and in my judgment it is now worth \$10,000.

O'CONNOR.

Cross-examination.

By Mr. Wykes:

All L'Anse property has increased rapidly in value in the last six months. The lot that I spoke of in L'Anse sold for \$300, in 1906; its ratio of increase has been 300 to 1,000. In the last year, the increase in general values has been 100% there, and there was a general increase along this strip.

O'CONNOR.

Recross-examination.

By Mr. Wykes:

Land values are increasing rapidly around L'Anse and in Baraga County, and have been for about 5 years. There is a greater demand for lands all through the county. There is more or less settlement and clearing going on all the time.

376

On October 1, 1912.

ARVO J. VITALI, a Witness called by Plaintiff.

Direct examination.

By Mr. Eldredge:

I have lived in Paynesville, Ontonagon County, for 4½ years. I sold out my mercantile business last spring, and am in farming and real estate now; have dealt in real estate for 5 years, both for myself and others. I am familiar with land values along South Shore, Sidnaw to Lake Gogebic, but no farther. I have brought over a hundred families of settlers to Trout Creek, Paynesville and Bruce's Crossing in the last 4 years, handling 4,000 or 5,000 acres.

On January 2, 1914.

VITALI, Recalled by Plaintiff.

Direct examination.

By Mr. Eldredge:

All the land in that territory around Kenton has increased in value

in the last year.

Since I testified previously there has been more clearings and settlers. I am putting values as they apply at the present time. All the land along this territory has increased during last summer. It has been put in better shape—better improvements and better cultivated. Values have increased, since I testified before, on account of nearness to Paynesville and increase in the general value of lands, and condition of this particular land. Several houses are being built north and south of this land during the last year, and town has grown to about twice former size.

377

On October 1, 1912.

AUGUST HUTULA, a Witness called by Plaintiff.

Cross-examination.

By Mr. Wykes:

Land prices have been coming up fast.

378

On October 1, 1912.

August Wallen, a Witness called by Plaintiff.

Direct examination.

By Mr. Eldredge:

I have lived at Ewen since 1891. In last 12 years, I have handled land and farmed. I have bought and sold 35,000 to 50,000 acres, and own 11,000 in the Upper Peninsula now, mostly in Ontonagon Co.

WALLEN.

Cross-examination.

By Mr. Wykes:

In 1891, they thought 50¢ an acre for cut-over land too high. Since then, there has been a steady increase. From Bruce's Crossing to Bergland, it hasn't gone up in the last 2 years, but east of there it has.

The cost of clearing cut over land is \$15 to \$60 an acre; \$60 is heavy pines stump land or hardwood; that is exceptional, and you can't afford to add the full price to land value. The \$15 kind is what has been burnt over, leaving hardwood and pine stumps. Now, there is brush and trees on it. Some of the big fires burned up the surface soil.

On January 3, 1914.

Wallace, recalled.

Further cross-examination.

By Mr. Wykes:

I am quite familiar with values all through the 37 miles west of Trout Creek and the lands adjacent. Prices in that locality are going up; not so much for some years before as now. I have made more sales to actual settlers this summer than ever before. The prices are double those of 5 years ago, and a year ago they were higher than 4 years before that. There is a gradual rise. That is true all the way — Kenton to Topaz; west of there it is not so. The tim-

ber lands 5 years ago were about at the same price as at present. Through this 37 miles, there is more or less clearing and settling; people are moving in, new houses are going up, and the

country is improving, in general.

The two miles out of Lake Gogebic, which I now value at \$5 an acre, has increased in value since I testified before. It would be earier to sell that land at \$5 now than at \$4 when I was here before; \$1 an acre is increase. Because the settlement is coming from Wakefield, they are building a county road, Tula to Lake Gogebic, opening up that country, the good lands along that line will be all right. I figure no increase in the \$8 land I spoke of; there has been some increase in value in everything else—a gradual increase.

380

On October 2, 1912.

JOHN CAMPBELL, a Witness called by Plaintiff.

Direct examination.

By Mr. Eldredge:

I have lived at L'Anse 40 years. I have been in merchandising business all my life; have dealt some in real estate. I know the value of property in L'Anse and Baraga county.

CAMPBELL.

Cross-examination.

By Mr. Wykes:

Everything is on the raise in L'Anse and toward Keweenaw Bay.

381

On October 2, 1912.

ADDLPH W. Peterson, a Witness called by Plaintiff.

Direct examination.

By Mr. Eldredge:

I have been in real estate and insurance business at Ironwood, Gogebic county, 17 years. I am familiar with lands along South Shore in that county.

PETERSON.

Cross-examination.

By Mr. Wykes:

In last 10 years, land values have gone up greatly, and timber values some. The farming industry is just developing, and proximity to Ironwood helped raise values. The increase in price of land along railroad has been general and gradual throughout this country.

382

On October 2, 1912.

JEROME BROWN, a Witness called by Plaintiff.

Direct examination.

By Mr. Eldredge:

I have lived at Matchwood 25 years—since 1887. They were then cutting the timber from the right of way and building South Shore. I first homesteaded some land, then logged 10 years, and since have farmed. Have owned 1,000 to 2,000 acres in Upper Peninsula. I was familiar with original character of land where railroad is; it was all mixed timber land. That was true from state line to Nestoria, except a small portion near Vermilac.

383

On October 3, 1912.

H. S. Thompson, a witness called by plaintiff.

Direct examination.

By Mr. Eldredge:

I live at Beacon, in the same locality as Champion. The former is the mine postoffice and the latter the station postoffice. I am assistant superintendent of the Oliver Iron Mining Co., in charge of Champion mine; have lived there 6 years, and am familiar with the property of South Shore.

For 1/2 mile each side of the station at Champion, the average value of right of way, simply as land, is \$300 an acre, provided village remains as it is. The right of way (% mile) of the mine track into Bacon, serving Champion mine, is worth \$60 an acre,

simply as land, provided the village stays there.

From 1/2 mile east of Champion to Humboldt, land along right of way is worth from nothing to \$15 an acre, simply for surface rights. Considering mineral rights, it is worth \$100 an acre, though it has not been explored successfully. An absolute right of way in fee greatly impairs mineral value. In a hard ore formation, it would be necessary to leave a strip 1,100 feet wide to support a 100 foot right of way. A soft ore formation would not require so wide a strip.

From Champion to Michigamme, the right of way is worth \$100 an acre, speculative value, straight through, as the first 3 miles west of Champion is in Michigamme slate formation and balance is in

Ishpeming and Negaunee formation.

384 THOMPSON.

Cross-examination.

By Mr. Wykes:

Caving distance given simply referred to our mine, but I don't think it is general. Around Ishpeming, they are mining under railroad tracks in a small way. They are driving drifts and tunnels under, but not mining out a big room. The character of mining possible, and the distance from the track, depends on nature of the There is no absolute rule. It depends on the depth of mining, whether the formation is vertical or perpendicular, and the strata of earth over the ore.

The 1/2 mile each side of Champion would not be worth \$300, if not located in a village of 700. There is no plat; it is just an unrecorded map made by the mining company. The 1/2 mile each way would go beyond the edges of the settlement, as houses do not

cover over 34 of a mile.

Champion to Humboldt, 34 of the land contiguous to South Shore is available for farming, and the other ¼ is swamp. It is worth from nothing to \$15 an acre average; close to \$15. There are no improvements of settlers there, close to the tracks. The soil is light and sandy, generally, though there is some good loam on the north side. You could clear that land for \$40, and that would make it cost \$55, which would be a good price for it. The iron formation in that section is in a basin of varying widths, and the space between the two formations at Champion carries possibilities. I fix the \$100 valuation on the chance of discovery of ore. In my 6 years at Champion, I haven't known of any prospecting along South Shore, Champion to Humboldt, except within ½ mile of Humboldt, where the Breitungs have been drilling. I don't know of any sales along

South Shore. Those lands are largely owned by corporations. In 1905, land in sections 28 and 29, 48-29, sold for about

385

\$100 an acre. I am not sure whether that was the same land

that sold for \$60 in section 29 or not, but it probably was not.

Right of way, Champion to Humboldt, is in the mineral formation. Only part of N. ½ of section 9-47-29 is in the formation. Neither the N. E. of S. E. nor N. W. of S. E. of 9 is in formation. The N. 1/2 of section 10-47-29 is in the formation, but the W. 1/2 of the S. E. 1/4 of 10 is not, nor is section 28-47-29. Sections 28 and 29 of 48-29 are affected.

Champion to Michigamme is 8 miles. The first 3 miles is flat pine plains; after that it is rocky. That 8 miles is worth \$8 an acre, average, for land, without reference to mineral value. Considering mineral possibility, it is worth \$100 an acre. The Oliver Iron Mining Co. drilled on the odd sections through there, last March, but I don't know the results. Mineral possibilities would be on sections

The last drilling was on section 21. 30 and 31, 48-20.

The purchase I spoke of, averaging \$100 an acre, was the mineral rights on 4 forties, and the fee to 90 acres. Consideration was

\$15,500.

The Oliver Iron Mining Co. has large holdings through here, and Champion Iron Co. owns all of section 31-48-29, except the right of way of railroads; also most of sections 32 and 33. The Oliver Co. is the operating company; the Champion Co. is in the steel trust. I think these lands have a speculative value of \$100 an acre, but do not think they should be taxed at that, he assessor cannot see that

I would sell the mineral and fee for \$110, if I owned them, but it is a broad question when you ask whether I would pay 386 that much. The value is sufficiently tangible so that I would ask that much for them, but not to be put on the assessment roll at that.

UNITED STATES OF AMERICA, Eastern District of Michigan, 88;

I, Elmer W. Voorheis, Clerk of the District Court of the United States for the Eastern District of Michigan, do hereby certify that the above and foregoing is a true copy of Volume 1 of Narrative Statement of Testimony on Appeal, comprising typewritten pages numbered one to three hundred and eighty-six inclusive with a preface of nineteen typewritten pages embodying written notices, affidavits of service, designation of contents of appeal record, original exhibits to be returned and court's order in the therein entitled cause as the same appears on file and of record in my office; that I have compared the same with the original, and it is a true and correct transcript therefrom and of the whole thereof.

In testimony whereof, I have hereunto set my hand and affixed the seal of said Court, at Detroit, in said district, this twenty-first day of November, in the year of our Lord one thousand nine hundred and eighteen, and of the Independence of the United States of America the one hundred and forty-third.

[Seal of the U. S. District Court, Eastern District of Mich.] ELMER W. VOORHEIS, Clerk. 387

Vol. 2.

On October 4, 1912.

A. E. Delf, a witness for the Plaintiff.

Direct examination.

By Mr. Butler:

I am Auditor of complainant. I have been employed by it since its organization in 1887, at the time of its organization as Chief Clerk in the Auditor's office; since 1894, as Auditor in chief charge of the accounts. I am and have been familiar with its accounts. They are kept in accordance with the rules and regulations of the Interstate Commerce Commission.

(Exhibits 25 to 30 inclusive, are various I. C. C. classifications,

which are produced and introduced.)

(Complt.'s Ex. 31, Delf, showing road owned and operated by complainant, by years 1910-1912, produced and offered in evidence.)

(Complt.'s Ex. 32, Delf, showing revenue locomotive mileage by years 1910-1912, produced and introduced.) This is correct and the records, from which it is made, were kept in the regular course

of business as prescribed by the I. C. C.)

(Complt.'s Ex. 33, Delf, being its revenue train mileage, 1910-1912, produced and introduced in evidence.) This exhibit is made from books, records, and papers kept in accordance with I. C. C. classification. The mileage of mixed trains is apportioned, 75% to freight and 25% to passenger regardless of number of cars or quantity of business in each class.

So far as my communications with other railroads have gone it is the general custom to divide, 25% to passenger and 75% to I have made no special inquiry, but in my railroad experience these things have come up. The I. C. C. makes rulings

upon its classifications; they are bound and published.

(Complt.'s Ex. 34, Delf, showing revenue and non-revenue passenger and freight car mileage, sub-divided, 1910-1912, produced and introduced in evidence.) 388

(Complt.'s Ex. 35, Delf, showing operating revenues 1910,

1911 and 1912, produced and introduced in evidence.) (Complt.'s Ex. 36, Delf, divisions of operating revenues in Michigan as assigned by Complt.'s Ex. 35, between freight and passenger departments in Michigan for 1910, 1911 and 1912, produced and introduced in evidence.)

(Complt.'s Ex. 37, Delf, giving routes and compensation for hauling mail, July 1, 1907, to July 1, 1911, and from July 1, 1911,

produced and introduced in evidence, later amended.)

Mixed train mileage: The division was 75% freight, 25% passenger. From 1894 to 1899 the I. C. C. on their blanks for report directed us to divide in that way. The commission has given no instructions on the subject since 1899 that I know of. Accounting bulletin No. 8, of I. C. C. effective July 1, 1912, Case 102, Query:

"The classification of locomotive miles, car miles and train miles, makes no provision for the division of mixed train miles, between passenger and freight. Upon what basis should this division be made?

A. No. division between passenger and freight has been prescribed

for mixed train miles."

(Complt.'s Ex. 38, Delf. Operating expenses of complainant for fiscal years ending June 30, 1910, 1911 and 1912, produced and offered in evidence.)

(Complt.'s Exs. 39 and 40, Delf, its reports to stock-holders for years June 30, 1911 and 1912, produced and introduced in evidence.) There is no division between states in Complt.'s Exs. 39 and 40,

Delf.

(Complt.'s Ex. 41, Delf, a statement of the method used in dividing operating expenses between states and method of 389 apportionment of Michigan proportion of expenses to pas-This is a statement of method and senger and freight business.) not of detailed figures, and the purpose is to determine the portion of operating expenses to be assigned to Michigan and to divide the Michigan proportion between the passenger and feight departments. (The Exhibits introduced in evidence.)

Lower half of Complt.'s Ex. 38, Delf, indicates the result of the application of the division of operating expenses between Michigan and the rest of the line as indicated on Complt.'s Ex. 41, under

"method of division between states."

The percentages on Complt.'s Ex. 41, Delf, were applicable to the year ending June 30, 1910; the same method was used for all three years, the percentages, however, might vary somewhat depend-

ing upon the business of the various years.

Neither the I. C. C. or Michigan, requires a separation of expenses between states and neither prescribes a method for doing so. Minnesota, the only public authority requiring such division, instructed us to divide all operating expenses between states on a train mileage basis. They commenced a short time ago; I am not sure that they still adhere to it. I do not know to what use they put this assignment.

In 1910, 84.32% of the expense assigned to Michigan was allocated.

		Mich.	Wis.	Minn.
1010	Allocated	\$1.612.717	\$278,000	\$20,554
1910	Allocated	299,847	57.495	594
1910	Assigned	1.912.564	335,525	21.148
1910	Assigned and allocated	4 704 007	288,679	10,919
1911	Allocated	1,591,937		
1911	Assigned	312,301	64,866	636
1911	Assigned and allocated		353,545	11,555
	Allocated		320.367	7,699
1912			68.539	640
1912	Assigned		388,906	8,339
1912	Assigned and allocated	1,997,913	000,000	(7,030,907

The percentages allocated to Michigan were: 1910, 84.-390 32%, 1911, 83.60%, 1912, 83.67%.

Complt's Ex. 41, Delf, also indicates the method by which the operating expenses apportioned to Michigan, are divided between freight and passenger business.

For the items divided on the basis of Michigan revenue train miles, I believe that is a fair and just method of making the division. Since 1893 or 1894, the complainant has made a division of

operating expenses between passenger and freight.

The purpose was to ascertain what we were doing in our freight and passenger business, as near as we could—the profit or loss. only applied it to the traffic items at that time, we did not bring into it taxes, rentals and things of that kind.

The operating expenses were kept in accordance with the I. C. C. classification. I believe some classification of operating expenses

by I. C. C. has been in effect since July 1, 1894.

The Interstate Commerce Commission required us to divide operating expenses between passenger and freight until in 1894, but since that time they have not required the division. During the time they required the division between freight and passenger they, by general instructions, prescribed a method for the division.

The method, generally speaking, was the revenue train mile basis used for the division of common expenses, and was the only one ever prescribed by any public authority so far as I know; the I. C. C. ceased to require it in 1894. I believe, however, the railroads have since, for their own purposes and information, continued to make such division. Our company has so continued.

In the operation of our railroad, passenger trains have precedence on the right of way over freight trains. Freight trains are required to side track and wait until the passenger trains 391 The freight train is heavier and has more cars on the average, while the passenger train is faster. The outer rail is raised on the curves to accommodate the faster speed of the passenger trains, which adds to the safety of the track and is not necessary

to the same extent for the slower trains.

Considerable company freight called "non-revenue freight" is transported over the road for the maintenance and operation of the prop-No account is kept of the cost of hauling that business which is for the common benefit of both departments, but hauled by freight No part of it is included in items allocated to the passenger department. It is hauled on regular freight trains more or less at all times through the year. Whatever the cost is, it is allocated to the freight business. No record has been kept and I cannot give any opinion as to the tonnage or amount. We could approximate the car loads-that would be all.

The greater part of the expenditure for operating expenses in the maintenance of way and structures account, is made necessary by

causes other than wear - by weather.

For rails, the larger amount is due to wear and the less is due to weather; on such items as buildings, fixtures, water tanks, stations, platforms, wooden buildings, and structures along and in the track a considerable portion of the expenditure is due to weather and a portion to wear. On items, such as fences, roofs of buildings, water tanks, etc., there is none due to wear.

I know of no way to determine the proportion of common expenses included in the general account "maintenance of way and structures,"

which is due to wear and which is due to other causes. Engineers have attempted a method for making the division between wear and weather. I do not know whether they have discovered a method or not. A division has been made or assumed; I don't know how they got at the percentage assigned to weather.

Under the transportation expense account, the primary accounts, yardmasters and their clerks, yard conductors and brakemen, yard switch and signal tenders, yard supplies, expenses, yard enginemen, engine house expenses, yard, fuel for yards locomotives, water for yard locomotives, are all divided on the basis of ten per cent to freight

That factor of division has been used by our company since 1893 or 1894, and I think fairly represents the proportion chargeable to each class of service. It is an estimate arrived at by consultation with operating officials, based upon their judgment. It would be difficult to arrive at division that is demonstratably correct—I think it would be quite impossible. The same crews, equipment and facil-

ities do both classes of switching.

The following percentages of total Michigan operating expenses were allocated between freight and passenger: 1910, 68.76%; 1911, 69.74%; 1912, 68.65%. The amounts not allocated were assigned.

	-	•															Pa	8	86	n	ger.	F	re	ig	ht.	*
1910											 						47	7	. 7	14	%	5	2.	. 5	39	%
1911											 . ,				•		* *									
1912											 					•								• •	*	

(Complt.'s Ex. 42, Delf, showing tonnage statistics, produced and offered in evidence.)

Complt.'s Ex. 42, Delf, includes only freight hauled under tariffs for pay. During the last fiscal year (ending June 30, 1912), we kept separately the interstate and intrastate freight business statistics in Michigan; previously we did not separate them. The facts

are clearly stated on Complt.'s Ex. 42, Delf. In keeping separate the intrastate freight statistics, it is necessary to consider each way bill, and at times the items on each way bill separately.

Both classes may be on the same way bill and both classes—inter and intra state freight—are in the same train and in the same car.

I believe from the general character of the business that the rela-

I believe from the general character of the business that the relation between the intrastate and interstate freight business in Michigan is fairly constant from year to year, and that the relation of each to the total would be substantially the same in Michigan.

(Complt.'s Ex. 43, Delf, showing passenger statistics in Michigan, produced, and offered in evidence.) This exhibit was made up by

me and under my instruction, and is true and correct.

In the case of interstate passengers moving partly within and partly without Michigan, the mileage assigned to Michigan is the

actual travel of each passenger in the state. For fiscal year 1912, we have kept the division of Michigan business between intrastate and interstate passenger business separately. The figures for 1910, 1911 and 1912, shown on Complt.'s Ex. 43, Delf, we worked up separately. The figures shown are the actual figures as to the things purported to be shown.

(Complt.'s Ex. 44, Delf, showing freight statistics of complainant, produced, and offered in evidence.)

Ore hauled to complainant's docks is all destined and billed to points outside Michigan by water; our haul is entirely within the state. Our charge is only made to our docks wherever it goes. This lusiness though handled on a local rate is in fact interstate business.

Complainant hauls iron ore from the Ishpeming and Negaunee district to points other than the docks at Marquette (E. G. Newberry, Mancelona, Cadillac, and Elk Rapids, Michigan), that I have classified as intrastate freight. We also haul some iron ore by rail to points in other states; that is classified as interstate freight. The only iron ore classified as such on Complt.'s Ex. 44, Delf, is that hauled from the Ishpeming and Negaunee district to the ore docks at Marquette, classified by me as interstate commerce. Other interstate iron ore is included in other interstate statistics of Complt.'s Ex. 44, Delf, but not separated as between commodities. Nothing is done with the ore at Marquette except to transfer it from the cars to boats by means of the dock.

(Complt.'s Exs. 45, 47 and 48, Delf, showing gross and net operating revenues, operating expenses, etc., in 1910, 1911 and 1912 respectively, produced and offered in evidence.)

The statements (Complt.'s Exs. 45, 47 and 48, Delf) are made in accordance with the I. C. C. classification as to definition of items, from data regularly kept and they are true and correct. Revenue and expenses are divided between freight and passenger, according to exhibits heretofore introduced in evidence in connection with my testimony. Hire of equipment, interest, joint facilities, taxes, rents paid (joint facilities), rents paid (miscellaneous) and separately operated properties (Mackinaw Trans. Co.), are divided between freight and passenger on the basis of income, which is for 1910, 66.90% freight, and 33.01% passenger.

In arriving at the estimated loss by the application of Act 276, of \$178,234.21, I estimated that the loss on that class of business in 1910, would be the difference between the rate of 2.563¢ and 2¢ or 5.63 mills per passenger mile. I estimated there would be no greater

amount of traffic under the two than under the three cent

For the exception of travel of distances of 5 miles or less where three cents may be charged, I made figures for 1912; the number of passengers 5 miles or less for year ending June 30, 1912, was 56,541, the revenue was \$5,477.35, and the one-third excess over two cents a mile was \$1,825.78.

To offset this amount I have made figures for children traveling at half fare based on two months' business, Dec. 1911 and June 1912. This applied to the year 1912 indicates an aggregate reduction below two cents per mile amounting to \$1,821.33 on entire business, \$1,-

324.31 on intrastate and \$498.22 on interstate business.

Referring to Complt.'s Ex. 43, Delf, showing the average haul on intrastate passengers for 1910 to be 31.18 miles, and average revenue per passenger per mile to be 25.63 miles; the saving to the passenger by the two cent rate would have been 5.63 mills on each mile travelled or 17.5 cents per passenger in 1910 and about the same in 1911 and 1912

In the passenger mile statistics I have given, children's half fare travel is treated as full passenger miles without distinction between full and half fares. Persons travelling on passes are not included. In arriving at the average amount per passenger I divided the total revenue received for transportation of persons by the total passenger

miles arrived at as described.

Leaving out the trips of five miles or less it would be impossible to get an average of two cents per mile if any children travelled at half fare. In arriving at the average haul, interstate passengers for 1910, 143.46 miles, average revenue per passenger mile 25.18 mills, for 1912, 128.79 miles, revenue per passenger mile 24.58 mills,

the passenger miles include only miles actually travelled in Michigan. If the entire interstate haul had been taken, the average haul of interstate passengers would be higher than stated on Complt.'s Ex. 43, Delf.

Revenue from passengers (page 3, Complt.'s Ex. 45, Delf) in-

cludes intrastate and interstate, actually arrived at.

Excess baggage, mail, express and other passenger train revenue, special train revenue, station and train privileges, telegraph service, rent of buildings and other property, miscellaneous, joint facilities (Bal. cr.) outside operations (sleeping and dining cars), hire of equipment, interest, rents received, joint facilities and miscellaneous income, were all treated as common and separated to inter and intrastate passenger on a percentage relation of revenue from passengers for 1910, of 56.39% to intrastate and 43.61% to interstate.

The passenger operating expenses were equated at 115%. That means it is assumed that it costs 15% more to do the intrastate passenger business than to do the interstate passenger business.

Complt.'s Ex. 46, Delf, shows the method of dividing on the

equated passenger mile basis. This method is as follows:

"You take the intrastate passenger miles and increase it by 15%, and take the interstate passenger miles as they are, without increase; you add the interstate passenger miles so increased to the interstate passenger mile and take a total and then ascertain the percentage of intrastate passenger miles so equated to the total, and of the interstate passenger miles to the total, to such total, equated total, and then apply those percentages to the total passenger operating expenses in the State, for the figures which are shown on the third sheet of Complt.'s Ex. 45, Delf."

397 The taxes, rents paid (joint facilities, miscellaneous and separately operated properties) were divided on the revenue

basis of 56.39% intrastate and 43.61% interstate.

They are then added to the operating expenses and the total deducted from the gross passenger income showing total net income for 1910 of \$270,097.49; intrastate net income \$134,118.35; and interstate net income \$135,979.14. Deducting the estimated loss of \$178,234.14, leaves for the whole passenger business in Michigan \$91,663.28, and deducting the estimated loss on intrastate and interstate business from intrastate and interstate net income, leaves \$30,757.42, as net income of intrastate business, and \$61,105.86, as net income from interstate business, after allowing for the estimated loss. (Objection to testimony as to loss, on the ground that it is purely speculative, and assumes that the traffic would remain the same under the reduced rates, which is assuming a condition without precedent and which cannot exist.)

On Jan. 8, 1913.

DELF, recalled.

Direct examination resumed.

By Mr. Butler:

(Complt.'s Ex. 52, Delf, showing estimated loss due to the two cent passenger fare, produced and offered in evidence.)
Complt.'s Exs. 45, 47 and 48, Delf and re-dividing certain items Complt.'s Exss. 45, 47 and 48, Delf, and re-dividing certain items listed therein, between freight and passenger business on different bases than in original exhibits, produced and offered in evidence.)

Item: Outside Operations (sleeping and dining cars \$5,606.54) Complt.'s Ex. 45, Delf, is a net item. The details are:

1910.	Revenue.	Expense.	Net.
Sleeping Car	\$25,803.21	\$14,060.06	\$11,743.15
Dining Car	26,365.35	32,501.96	-6,136.61
Total	\$52,168.56	\$46,562.02	\$5,606.54
Sleeping Car	26,262.23	14,548.14	11,714.09
	28,095.75	33,473.62	-5,377.87
Total	54,357.98	48,021.76	6,336.22
Sleeping Car	26,685.83	17,506.87	9,178.96
Dining Car	29,908.08	37,673.56	-7,765.48
Total	56,593.91	55,180.43	1,413.48

There was a great deal more expense in repair of sleeping cars in 1912, and sleeping and dining car expenses increased.

(The Complt.'s Ex. 53, Delf, being Railroad and Census Statistics for the Upper Peninsula for 1910, produced and introduced.

Complt.'s Ex. 54, Delf, being a statement of operations and of resources and disposition, 1887 to 1912, produced and offered in evidence.)

The D. S. S. & A. commenced operating a railroad Jan. 1, 1887. I have been in the accounting department since its organization, in

charge since 1894.

Column, "gross earnings" includes only operating earnings according to I. C. C. reports prior to 1908 and to classification 1908 to 1912, except that revenue from sleeping and dining cars is included. The column does not represent exactly the same thing all the way through, but very closely the same. It corresponds with the requirements of I. C. C. in force at different times.

Column "operating expenses," prior to 1908, included rentals of equipment, which are since included in "other deductions from income." That column is set up in accordance with the

399 1. C. C. classification at the time, except the inclusion of expenses of sleeping and dining cars as noted.

Column "other income" is made up of rentals received, dividends and miscellaneous items, being all receipts from sources other than income.

Column "total income" is sum of "net earnings" and "other in-

come" and is total from all sources, less operating expenses.

Column "taxes accrued" is taxes actually paid, except for fiscal year 1912, where amount is estimated from previous years' taxes.

Column "interest on bonds" is interest accrued.

Column "other deductions from income," 1887 to 1880 all payments were dividends of M. H. & O. stock guaranteed by complainant. These dividends ceased in 1890 when complainant purchased the M. H. & O. 1891 to 1907 the payments were largely interest on unfunded debt, on car trusts and miscellaneous; 1908 to 1912 the amount was in accordance with I. C. C. classification, consisting of interest on unfunded debt, car trust, miscellaneous interest, rentals, separately operated properties, expenses of Mackinaw Trans. Co., company's bad accounts written off, loss on track and buildings abandoned and depreciation that accrued prior to July 1, 1908, on equipment destroyed in current period.

In each instance the depreciation was that which accrued prior to July 1, 1908, but was not charged off until the equipment on

which it had accrued was put out of service.

Prior to Jan. 1, 1887, the existing lines of railroad now owned by South Shore were Mackinac and Marquette, successor to Detroit. Mackinac and Marquette, for the line St. Ignace to Marquette, and constructing or about to construct Soo Junction to Soo, the Sault Ste.

Marie and Marquette, the Wisconsin, Sault Ste. Marie and Mackinac and the Duluth, Superior and Michigan Railways. I do not believe the latter three had any line. Our records

give no information with regard to them. Our company did not become possessed of the records of the companies to which it succeeded; we haven't the construction records, accounts showing cost of road, or anything of that sort. In 1887 upon organization the D. S. S. & A. leased the M. H. & O. whose line extended Marquette to Hough-The roads thus consolidated and leased formed a line from Sault Ste. Marie and St. Ignace to West Superior, Wisconsin, and from Nestoria to Houghton, as finally completed.

In 1890, the lease from the M. H. & O. to D. S. S. & A. terminated when the D. S. S. & A. purchased all the property of the M. H. & O. including the stock of the Marquette and Western road, Marquette to Ishpeming. This was done through purchase of M. H.

& O. stock; that corporation still exists.

There was an intermediate organization—the D. S. S. & A. syndicate-which collected the property together and transferred it by

articles of consolidation to the D. S. S. & A.

These other companies, though they didn't build any road, had some land grants on conditions or something of that sort. D. S. S. & A. became possessed of certain granted lands other than those used for operation, in substantial quantity, through purchase of the M. H. & O. It has disposed of some lands and still has some. The proceeds of land disposed of appear on sheet 1, Complt.'s Ex. 54, Delf, in column "other income." There are some substantial amounts in 1909, \$146,000; 1911, \$249,000. Of the latter amount \$193,507.82 is proceeds of the sale of those lands.

The larger part of the 1909 amount was dividends from Western Express Co. stock formerly owned by complainant, but now sold. I have not the details of the items 1909 to 1912 "other in-401

come"; they don't show in our books, they are made up of

numerous items.

Capital stock of \$22,000,000 was issued about the time of complainant's organization. \$22,000,000 of stock and \$4,000,000 of 5% first mortgage bonds were given for the road as it stood in 1887the consolidated property, that east of Marquette and some west of Nestoria, which was under construction. It was being built by the D. S. S. & A. Syndicate—Calvin Bryce, Hugh McMillan and I think James McMillan and others were interested.

The consolidated mortgage 4% bonds \$15,107,000, were authorized

at one time and issued at various times.

The times of sale and prices were as follows:

May, 100c	Amount \$11,000 \$1.065 \$	t sold. Price. 0,000 82½ 7,000 82½ 83,000 82½
	12,600	

Dec. 1892, \$2,000,000 delivered to C. P. R. in consideration of its guaranteeing interest on entire issue. January, 1895, \$323,000 issued to retire M. H. & O. 6% bonds for same amount. December, 1896, \$53,000 issued to retire D. S. S. & A. 5% bonds for same

amount. September, 1897, \$78,000, issued to retire D. S. S. & A. bonds, same amount. November, 1897, \$53,000, issued to retire D. S. S. & A. 5% bonds same amount. Total \$15,107,000. Total \$15,107,000 now outstanding.

The D. S. S. & A. 5's retired (\$184,000) are a deduction from the

total amount of the issue \$4,000,000.

M. H. & O. bonds \$4,856,700, were first mortgage bonds outstanding when complainant purchased the road. Some of them (\$1,077,000) are still outstanding. Income certificates \$3,-

402 000,000 4's, issued Dec. 31, 1892, to retire other obligations.

No interest has ever been paid on these—they are obligations outstanding. There is no interest to be paid on them unless it was earned over and above other interest. Car trust obligations represent equipment notes. Total income: the caption "Disposition" shows what was done with the resources.

Item, road and equipment, \$47,182,526, is the total amount in securities of the company paid for the road and includes additions,

betterments and extensions.

The reserve for accrued depreciation in amounts charges to operating expenses to cover depreciation on equipment and ore docks.

The South Shore Land Co. stock is \$3,000 all owned by complainant; it owns the lands on hand of the old land grant, and being sold from time to time; that company is managed by officers

of complainant.

For six years prior to 1910 the D. S. S. & A. ran its through trains from Houghton to Calumet—through passenger trains, and also some through freight trains from Houghton to Calumet, over the Mineral Range Railroad, and charged the Mineral Range railroad rental for the equipment, locomotives and cars which constituted the trains, and the latter part of 1909 and the early part of 1910, the Mineral Range Railroad Company protested against that, claimed that it was an injustice to them to charge them that rental, that they didn't get a dollar back for what they were required to pay, and the D. S. S. & A. railroad company agreed with them—agreed to refund the six years rental that had been charged them on that equipment.

403 "The Master: Was that a gratuity; were they under any

obligation to refund it?

A. No, except that it was an injustice to charge it in the first

place, it was so considered by the officials of both companies."

In addition to that rental the Mineral Range paid part of the operating expenses of the trains. The South Shore owns 53% of the Mineral Range stock. The officers of both companies are practically the same. The minority stockholders raised the question as to whether these payments of rental of equipment were right, and the refund for those 6 years, aggregated \$48,399.44. The amount of refund appears in column 8, "other deductions from income, 1910," no part of it was included in operating expenses.

Loss on tracks and buildings abandoned. This appears in "other

deductions from income," 1910, 1911 and 1912.

Depreciation prior to June 1, 1907, appears in "other deductions from income."

First mortgage 5% bonds retired, appears in item \$15,107,000 M. H. & O. bonds retired. Appears in same item under "resources." Car trust obligations retired, appears in same item under "re-

sources."

I have not seen complainant's bonds listed in Market reports for a long time. The interest has been regularly paid on M. H. & O. bonds and first mortgage 5% bonds. Interest on consolidated mortgage 4 per cent bonds is in default. I think there was a small payment in 1912. The record shows. Paid interest 1887 to 1912 by years, a total of \$12,631,201.90. The interest was paid in full 1887 to 1891. Since that time there has been default of interest each year.

I believe the M. H. & O. bonds, first mortgage 5's outstand-404 ing are held generally by the public. The consolidated mort-

gage 4's are all held by C. P. R.

In 1892, \$2,000,000 of this issue was given C. P. R. in consideration of its guaranteeing the interest on the entire issue. In 1912 we paid \$100,000, and in 1911, \$150,000, and in 1910 nothing as interest on consolidated mortgage 4's. I have not the records back of that.

The majority—about 51%—of complainant's stock is held by C. I don't know where the rest is held.

(Complt.'s Exs. 35a, and 36a, Delf, being joint facility items,

1910-1912, produced and offered in evidence.)

(Complt.'s Ex. 55, Delf, being operating income and maintenance, and tabulation of operating expenses and taxes of various railroads for various years, produced and offered in evidence.)

I am familiar with the trackage of complainant in Michigan allocated by Riggs as freight tracks on which freight trains alone move, and the yard tracks in Michigan on which both freight and passenger switching is done. I have given attention to the relative cost of maintenance, of such freight and yard tracks and the cost of maintenance of other tracks, principally main line.

From inquiries of the general superintendent and road masters, it does not cost over one-third as much per mile to maintain those tracks as it does to maintain main line tracks. (Objection to the testimony as hearsay.) Independent of inquiry, I know it does not cost as much to maintain those tracks—there is very little mainte-

nance put on them.

In my opinion, independent of inquiry, it does not cost over onethird as much per mile. The accounts do not show the difference in cost. The freight branches and side tracks are 405 not maintained to the same standard that main line tracks are; the use, especially of exclusive freight tracks, is not nearly so It would be difficult to state the proportion of use. Different tracks have different degrees of use. This is true also of main line.

The traffic is more dense on parts of the main line than on others. Freight tracks to serve mines while used occasionally during the season of closed navigation, are subject to relatively small use during four or five months, which makes a great deal of difference in maintenance.

DELE.

Cross-examination.

By Mr. Wykes:

In my opinion, Mr. Riggs was wrong when he stated that the degree of maintenance on some mine tracks, spurs and branches, to mines, was as good as on main line. I have been over the tracks more or less, but not for the purpose of inspecting them; I have lived among them all my life and from general observation, know their

condition and how they compare with main line.

I have had no experience in maintenance department; I was in the station service for some years; my business has been confined to accounting for 25 or 30 years. I cannot separate the accounts so as to say what money is spent on a particular spur; we do not do The passing track is not maintained in as high a state of efficiency as the main line which is used by both services-passenger and Sidings in common use-freight and passenger-would be maintained in the same state of efficiency as those exclusively freight.

There is no way to give separately the income from property used exclusively for freight, and I have no judgment as to the propor-

tion that the income would bear to that of the system as a The freight charge covers the entire service. 403 mines are classified in to two districts, all in a single district

having the same rate.

The mines in a particular district are of varying distances from the main line. The furtherest mine in the Ishpeming and Negaunee district is at least one and a half mile- from the main line and

gets the same rate as mines located close to the track.

In selecting the roads for Complt,'s Ex. 55, Delf, I considered that they were roads to a great extent in about the same territory and operating under similar conditions, as complainant. There are other roads other than complainant's in the Upper Peninsula, but I could not get complete reports of all of them; I included no road in Michigan other than complainant and the Wabash.

I do not know even in a general way, what other roads show.

Annual reports are not all compiled in the same way, and the figures in the report, of one road, would mean one thing and in the report of another road another, and to put them together in comparison wouldn't be a proper comparison so I took the reports that were made up in about the same form to make this report from. tried to get some other roads into this but I was obliged to drop them.

Complainant's capital stock \$22,000,000, and bonds \$4,000,000, were the consideration for purchase of the railroads at the time of D. S. S. & A. consolidation in 1887. I don't know the value of these. The item "road and equipment \$47,000,000 is a price for the road fixed by the amount of capital stock and bonds then issued, rather than the value. I do not know that C. P. R. paid for this stock. (Complt.'s articles of consolidation produced and marked Defts.' Ex. 12.)

The D. M. & M. was a land grant road. My understanding is none of its lands went to consolidated company; I think separate land company was organized and the lands retained by it.

Complainant acquired M. H. & O. in 1890, by acquiring almost the entire capital stock; I understand the M. H. & O. still holds regular

annual meetings.

In July, 1890, lease from the M. H. & O. to the D. S. S. & A. was abrogated, and at the same time the D. S. S. & A. purchased all the property of the M. H. & O. including all the stock of a road called the Marquette & Western railroad running from Marquette to Ishpeming. When the South Shore acquired the M. H. & O. the stockholders of the M. H. & O. authorized its officers to transfer the road to the South Shore on certain terms, which included the assumption by the South Shore of all the debts of the M. H. & O. Company and an agreement by which for each share of preferred and common stock, the holders thereof were to receive, if applied

for within a certain time, a certain sum in cash.

In 1890 at the time it was acquired by the South Shore the M. H. & O. still owned its land grant lands and they came to South Shore. Later the South Shore Land Co., with \$3,000 capital stock, was organized in 1898, and the lands deeded to it. The officers of that company are practically the same as the officers of South Shore and the proceeds of land sales from time to time are carried into South Shore accounts. Complainant owns all the South Shore Land Co.'s stock. At the time the M. H. & O. was taken over by complainant, the land grant lands left were about 87,000 acres. The net income, from that time to the present, has been about \$193,000. The complainant held the lands 8 years at least, I think it has sold some directly, at least it has sold some timber. The amounts re-

ceived for that would be in addition to the sum already stated. The figure \$193,000 referred to the South Shore Land Co. operations. In the neighborhood of 70,000 acres of land

might still be remaining.

Complt.'s Ex. 53, is taken from population of the entire Upper Peninsula, much territory in the Upper Peninsula is not tributary to the South Shore. The principal cities of the Upper Peninsula are Sault Ste. Marie, Marquette, Negaunee, Ishpeming and Houghton on South Shore line and Calument, Escanaba, Gladstone, Manistique and Iron River, not on South Shore line. It is not possible to say just what territory is tributary to South Shore and what is not. If I had taken the counties through which the South Shore runs, it would have produced different figures from those on Complt.'s Ex. 53. The towns named are reached by different railroads.

In Complt.'s Ex. 52, Delf, in figuring the loss due to two cent rates, I have assumed each year the same business as was actually done, and that the rates would go to a flat two cents,

The dining car service shows a loss for 1910, 1911 and 1912. The dining cars are owned by the South Shore, being (1910) two diners and two or three combination cars. The combination cars

have chairs with an extra charge for seats.

In 1912 there were four diners and two combinations. in that business is the difference between cost of the service and the The cost of service includes repairs and depreciarevenue from it. tion of dining cars, supplies and services of employees. combination cars it is all charged up as dining car.

All parlor car fares go into the dining car revenue; the loss is in part for chair car service to which passenger on ordinary ticket, at 2¢ or 3¢ is not entitled, without extra payment. All passengers are entitled to dining car service upon paying for the meal.

Our revenue train mileage is stated in our exhibits, includes mileage made by our trains and C. N. & W. trains 409 hauled by us, Houghton to Calumet. We ceased to carry mileage made on the Mineral Range in our revenue train mileage, Oct. 1911.

Neither our revenue train mileage or revenue locomotive mileage, includes any switching mileage. In term switching mileage, we follow I. C. C. classification; the uniform method of counting miles of switch engines is to calculate six miles to the hour regardless of how many the engine runs. The train and car mileage are actual.

We try to be quite critical to see that the entire cost of new construction is charged to the account of a particular station. does not include transportation, of men and materials, or engineering, superintendence or supervision. If an engineer was put on a piece of work for a considerable time, that cost would be charged

This is the practice, though it is an entirely new structure. to it. endeavor to get all the cost of material or workmen on a building charged to to it, but are so particular as to superintendence and things of that kind. So far as the cost involves additional expense over the general current expense, we seek to get it into the particular

item of property.

We cannot divide the train mileage up into the different portions of the road so that I can give a statement of the train mileage on tracks not used in the passenger business. On track mileage that Mr. Riggs located to freight, practically none of our train mileage is computed; switching mileage is made on that. The train mileage is made almost exclusively on the trackage operated jointly by the freight and passenger service. Not one per cent of the train mileahe is made on tracks used exclusively in freight business.

On exclusive freight track mileage, the expense of Mainte-410

nance is less than on the main line mileage.

On Complt.'s Ex. 41, Delf, under maintenance of buildings fixtures and grounds, 96% was actually allocated to Michigan; this includes all the expense of the Marquette shops. Those shops are used to keep in repair and rebuild equipment used on the entire line. make any separation to the repairs that Wisconsin got from those The locomotives are overhauled, repaired and rebuilt in the machine shops at Marquette, and those expenses are allocated to

Michigan in the same way. We have no extensive shops anywhere on the line other than in Michigan. A small amount of repairs might be done at Thomaston, a very little at Superior, Wis. We have no shops there; some car repairs are made at Superior by car repair crews. We have car repair crews along the line in Michigan; at the terminals St. Ignace, Soo, Houghton, and at various points where cars might require repairs. The only repairing done outside Michigan is at Superior. In 1910 the expense was maintenance alone; in 1911 maintenance and replacement of the shop that burned, which was charged to operating expenses.

The expenses of Mackinaw Trans. Co. are divided on the basis of the revenue which the owning companies have earned on their rails on freight business. This is because the revenue from passengers is first deducted before dividing the expenses. There is a charge of 50¢ per passenger for coming over the Straits which goes to the

Mackinaw Trans. Co.

That it subtracted from the total operating expenses and the balance is divided between the companies on the relation of the freight The revenues used in dividing the Mackinaw Trans. Co., expense are the entire freight revenues of the participating

companies from the business crossing the Straits. 411

Outside agencies consists of agencies in connections with the traffic department and located off our line, e. g. at Pittsburgh, New York, Boston and Ashland-agencies that are working to secure traffic on our line. In various eastern cities where the C. P. R. has agencies they represent us and we pay a portion of the cost. It is a joint agency for the purpose of directing and securing business to pass over our line. In 1910 the outside agency expense was \$55,977.24, which included commissions paid to agents in various territory adjacent to our line, for selling tickets.

In Calumet, Marquette, Houghton, Negaunee, Hurley and Ironwood, saloon keepers and men in stores are in touch with the foreign population and sell tickets for which we pay them a commission; that is charged to outside agencies. There is also some payment to agents of the G. R. & I. and P. M. Charges for outside agencies were assigned to Michigan, apportioned to passenger, and divided to intrastate and interstate on equated passenger mile basis. The divisions

1910 1911 1912	. 59,242	Michigan. \$46,686 49,113 50,929	Passenger. \$33,966 37,170 37,811		Intrastate passenger. 59.36% 63.42% 66.8%
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We used the proportion of business done in each department of interstate and intrastate, equated by the addition of 15% to the intrastate passenger business, in making the division of outside agencies between inter and intra state passenger business, but did it by an arbitrary basis applying the 15% extra cost to the intrastate business. I don't think that by examining the vouchers it would have been

possible to locate parts of the expenses as between inter and intra state passenger. In a few instances it might have been possible. So far as commissions are concerned our accounts 412 show the ticket and the routing on which the items of commissions are paid. So far as a particular outside agency is concerned our records do not show the business that came to our line from that

The expense is composed in part of rent of offices in Pittsburgh, New York, etc., and salaries to agents, etc., including advertising,

As to the plan or formula of Complt.'s Ex. 41, Delf, we have been making divisions on that basis 18 or 20 years in our office, except that we did not divide between states until we came into this case.

We have not divided on our books between passenger and freight; we have made up statements separating between them for 18 years. They are not submitted to any one, we just keep them as a matter

of record and information ourselves.

We did not use those statements in making Complt,'s Ex. 41, Delf; the results of previous divisions would vary some from the results in Complt.'s Ex. 41, Delf. I never investigated to see how much. endeavored to make entirely new allocations and to be more particular in compiling Complt.'s Ex. 41, Delf, than in making those other There was change of method in some instances.

The report of the apportionment of our expenses in our 1910 report to the Michigan Commission, was on a still different basis. was a difference of some \$17,000 in the Michigan expenses between that and the present assignment in the division between states.

Complt.'s Ex. 41, Delf, to a considerable extent was the method of apportionment of expenses used in the Minnesota Rate

Cases, though the formula used is not the same. I could not point out the differences. Complt.'s Ex. 41, Delf, is a com-413 bination of the information from the Minnesota Rate case, and our previous practices; it is my judgment of a method of division of operating expenses based on our practices and conditions and the Minnesota Rate Case. I have not the Minnesota Rate Case in mind, so I cannot make or name any definite item of difference or similarity. I do not recall how, but our method seemed more accurate and to make a better division.

The Master: You spoke of some different conditions obtaining on

your road, can you specify any of those conditions?

A. Our road runs practically into only two States. The roads in Minnesota run into a number of States and are much more complex as to States than ours. We run directly from one State across the line into another. They have branch lines running into several It is much more difficult for them to make the division between states than it was for us having a single line running directly from one State into another.

Certain switching expenses, including yard expenses were assigned 10% passenger and 90% freight. The ratio is arbitrary representing about the proportion of service assignable to each class of business. We have used that basis for 18 years, it being fixed by my

predecessor. I do not know what he based it on, but our general superintendent says it is fair, so I have continued it. It is difficult to get at the switching movement of freight and passenger trains. do not know whether if gotten at, it would produce the same percent-A passenger train does not require as much switching as a freight train; the cars are assigned to particular trains and run in

those altogether in passenger service. In freight service trains are made up of cars that come in, or are loaded, from 414 different points and the entire number of cars necessary to make up a train are put together by switching service each time a

train is made up.

I presume the reason for decreases in freight train miles 1912 under 1910, is decrease in traffic, though I find the average number of freight cars per train has increased; it was: Passenger, including all passenger train cars, and freight train cars per train mile:

Year.														Freight.	Passenger.
1910					۰				٠	9				16.94	4.39
1911	9			٠		9								18.18	4.43
1912		0	0		*			۰				0	0	18.68	4.52

It would be possible by increasing the number of cars in a freight train to do the same amount of business with a less number of train miles. Increasing the number of train miles in the freight department, the passenger train miles remaining the same, would draw a greater amount of expense to the freight department (or vice versa) if you used the revenue train mileage basis to apportion expenses. The integrity of this basis varies with the make up of the trains.

The Mackinaw Trans. Co.'s loss was: 1910, \$27,213.61; 1911, \$19,832.17; 1912, \$30,020.28. Those are deducted in reaching final net income results; a part of the loss is assigned to intrastate passenger business. The loss stated is the final proportion of the D. S. S. & A., which pays 40% to 50% of the total, being based upon earnings from our freight business passing over the ferry. We divide our loss with the Soo Line. Their earnings and ours go in in arriving at the earnings west of the Straits and expenses are then subdivided between us and the Soo Line on the basis of our earnings and theirs.

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The loss is the expenses of the ferry with no compensating revenue to offset it. The freight income from the ferry is so small as to be negative; there is a little local business Mackinac to St. Ignace; it would not amount to .1% of the total.

The only income of the Mackinaw Trans. Co., outside of the little from local business is for carriage of passengers at 50¢ each, and

mail and express.

I cannot give the income from freight of Mackinaw Trans. Co. as there is none, except as it enters into the through rate. There are no statements by tonnage or by cars.

The three companies participating in the M. T. Co. could not exchange business between each other if they did not have that

facility; they could not get along without it.

We receive and receipt for the business over the ferry at St. Ignace. The other companies receipt for the business from the South Shore at Mackinaw City.

St. Ignace is really the initial terminal on our line. It has to be re-distributed at St. Ignace if there isn't enough freight in the car to go along, and that re-distribution is made by our company.

Western Express Co: Previous to 1909 complainant and the Soo Line each owned one-half of its stock. In 1909 complainant sold to the Soo Line; the C. P. R. owns the controlling interest in both Soo Line and complainant.

The capital stock was \$50,000. The South Shore had always received 45% of the earnings of the express company over its line. On 13 express companies reporting to the I. C. C. for year 1910, the

average paid the railway companies was 49% plus.

When the South Shore owned the stock of the express company there was a minimum guaranty of \$3500 per month which does not now exist. The proceeds of the business fall below that guaranty.

Legal expenses as shown in the operating accounts were:

Year.																	Entire line.	Michigan.
1908												 					\$5,641	\$5,186
1909	_	-															5,647	
1910										0							6,210	5,186 4,988
1911	-	-															6,049 27.846	26.266
1912			۰	۰			 					0	0 1			9	21,040	20,200

The expenses of this case, not including the time of Mr. Eldredge, Mr. Walker, or other men who assisted in the litigation, other than experts and attorneys, was for 1912 \$19,083, all of which was charged to passenger department, and 66.8% to the intrastate business on the equated expense basis.

The Mackinac Trans. Co. expense is all allocated to Michigan.

The 15% with which the intrastate business was equated, has been applied in the division of baggage, express and mail expenses,

being spread over all the intrastate business.

The intrastate passenger business is becoming more dense every year; a steady increase from 1910 to 1912. The interstate has decreased. The ratio of operating expenses to income on the intrastate business as shown by my assignments, has increased.

	1910.	1911.	1912.
Operating ratios on intra- state passenger business as arrived at by Delf	67%	72%	78%
On interstate passenger busi- ness as arrived at by Delf	59%	65%	72%
On total business in Michigan Rates per passenger mile Interstate passenger miles Intrastate passenger miles	2.563ϕ $14,454,301$ $18,358,957$	2.558ϵ $13,031,225$ $19,645,802$	2.604¢ 11,484,564 20,090,114

The usual rule is that, other things being equal, the more 417 dense the traffic, the less the operating ratio. I do not know why that rule is not borne out in this instance.

Operations of Mackinaw Trans. Co. have always shown a loss.

1010	Dining cars, No. of meals.	Passengers carried entire line.	Seat fares, Michigan.	Average haul.
1911 .	37,550 $37,289$	719,169 $785,622$	$7,792 \\ 8,498$	55.80 miles 50.26 "
1912 .	38,179	790,239	7.973	47 65 "

Total cost of Soo Union Depot property including all buildings and grounds to June 30, 1911, was \$117,812.11; the passenger station cost \$29,845.52; water supply \$2,060.44; heating plant \$7,-762.62; the emigration building \$2,622.95; the sewer \$3,668.79; miscellaneous \$1,365.38. These are costs to Union Depot Co.

The northbound less than car load freight coming across the straits, is loaded as far as possible by the Michigan Central railroad at Detroit and Junction yards, with reference to the D. S. S. & A. freight, all in one car, and it - sealed and comes through across the straits to St. Ignace under seal. The same is true of the freight loaded by the Grand Rapids & Indiana Railroad destined to points on or via the D. S. S. & A. and loaded at Grand Rapids and Ft. They load less than car load freight and the cars to and through St. Ignace under seals, it is there checked by our force, rearranged and re-loaded if necessary into west-bound cars on the D. S. S. & A. or cars going via the D. S. S. & A. and the Soo Line. North bound less than car load freight, is all checked and some of it reloaded, rehandled and readjusted at St. Ignace. On south bound business arrangements into car load lots for points in and beyond

Detroit are arranged, etc., at St. Ignace. This involves re-418 handling of most small freight at St. Ignace. The freight coming onto our line across the ferry involves re-handling or the same thing. If there were enough freight in the car it might

go through to Detroit without change at St. Ignace.

Freight handled through the Soo over C. P. R. is handled at St. Mary's Transfer station at Soo in charge of the complainant and Soo Line, who bear the expense equally. Business coming on the Soo Line and D. S. S. & A. if going east, is transferred to C. P. R. cars; going west it is transferred to D. S. S. & A. or Soo Line cars, as the case may be, at the expense of those companies without the

C. P. R. participating.

The Western Express Co. was organized 1895; to August 28, 1906, D. S. S. & A. received the total net earnings on its line. gust 28, 1906, contract fixed 45% of gross earnings of express company on D. S. S. & A. with minimum of \$3500 per month as D. S. S. & A. proportion. June 1909, D. S. S. & A. sold its stock in express company to Soo Line at par, when a new contract was entered into giving D. S. & A. 45% of gross earnings on its line with no monthly minimum. To the time of sale the express company had

accumulated a surplus of \$192,300 of which D. S. S. & A. received 50% or \$96,150. There were no dividends paid previously.

During the time when railroad company received the entire earnings on its line, the D. S. S. & A. had withheld from its payments certain amounts as working fund, and this was distributed to South

Shore in 1902, \$9,640, and 1905, \$5,000.

Up to 1906 the contract of the Western Express Co. with the railroad companies (Soo Line & D. S. S. & A.) was that each should receive the net earnings made by the Express Company on its line. Up to June 30, 1908, D. S. S. & A. and received in earnings from the

Western Express Co. \$562,986.39. We have no expenses in connection with that. The D. S. S. & A. upon the \$25,000 stock received about \$41,700 a year. It sold this stock for

The express revenue for subsequent years was: 1909, \$41,793.38; 1910, \$39,531.51; 1911, \$38,827.28; 1912, \$31,374.04. A part of

1909 was under the old contract.

I don't think that accounts for making it so much higher. I think the rates and the earnings of the express company were higher at that time. The only difference was one contract provided for a minimum and the other did not. I don't think the Western Express Co. operates on any other road than these two, except a small portion

of the C. P. R. in Maine.

In apportionment of the advertising expense as between passenger and freight 991/4% was allocated and 1% divided on Michigan train miles; total to Michigan was \$3,624.56, with \$3,586.94 to passenger. This was divided between inter and intrastate passenger on equated basis of 100 to 115; 59.39% to intrastate and 40.64% to interstate. A considerable proportion could have been assigned to inter or intrastate directly on inspection of the vouchers. We did not do that as where were so little of the expenses where that could be done, and there are other items, other accounts, where assignments could have been made less satisfactory, but which would have assigned a good deal more to intrastate than we have done. It is impossible to do much in the assignment of the expenses between intra and interstate except in one or two accounts. But upon a number of accounts it would have been possible to have quite readily assigned between inter and intrastate a part of the items at least. So far as my accounting has made any separation between interstate and intrastate expenses, it has not ben based upon any requirement of the Interstate Commerce Commission.

420 The income and expenses of the Mackinac Trans. Co. are as

follows:

10110						13 manual and a second
	Total.	Mail.	Express.	Freight, misc.	Pass.	Expenses, including taxes.
June 1909 to April 1910, 10 months	\$43,697	\$1,324	\$2,053	\$2,039	\$38,278	\$102,443
May 1910 to April 1911, 12 months	10.001	1,443		2,852	43,506	96,323
May 1911 to May 1912, 13 months		1,723	1,746	4,912	45,711	102,178

We have no figures indicating the amount or tonnage of freight passing over the ferry. There is a record of the number of cars. I could not approximate without it. In apportionment for 1910 under docks and wharves, the following number of cars transferred, appears:

													Freight cars.	Passenger cars.
1910		9			9					a			50,055	5.347
1911										0			49,578	5,304
1912									u				44,894	5,972

The term passenger cars, includes baggage, mail and observation cars.In apportionment of expenses I treated one passenger car as equal to two freight cars.

Maintenance expenses on the trackage used exclusively in freight business is scattered through the accounts, and it would be impos-

sible to pick it out.

It was impossible to ascertain the expenses on those tracks therefore we could not allocate them to freight. We could not do otherwise than to take the arbitrary basis of train miles for that.

I do not know any other basis that would divide the expense as well as the revenue train mileage. There is no way to pick out the maintenance of way and structures expenditures, incurred on account of the freight business. It cannot be done. In my opinion the cost

of maintenance of such tracks is not over one-third of the cost 421 per mile of the cost of maintenance of main line tracks.

There is about 62 miles of it.

If I were making an estimate I would say one-third is a fair figure. That is my idea of the average; some are maintained better than others. On some the maintenance is very slight, and on others it is considerably higher. The Fiborn branch would be higher. It would be impossible to do much more than estimate; I tried to do that.

On Complainant's line, both freight and passenger traffic are more

dense Marquette to Houghton than on other parts of the line.

I should say traffic was heavier from Marquette to Soo than from Nestoria west to State line. On both those divisions the traffic is considerably lighter than from Marquette to Ishpeming and there to Houghton, both in the freight and passenger departments. ment is it would be slightly heavier Soo Junction to St. Ignace than Marquette to Soo Junction.

I cannot tell you on what part of the line the operating expenses are heaviest; we do not endeavor to separate them by divisions. I think we might give you some maintenance costs as to divisions, but we don't separate operating expenses. We make figures on separate sheets as monthly exhibits for our officials for their information, so they can compare what is being done in certain items on one division

with another division.

On the South Shore there are four trains that run in two statestwo each way a day on main line. There may be other trains that come up over the state line from the south, considered as interstate, where we attach a locomotive to the interstate train and take it

No records of the train or car movements or switching opera-422

tions in the yards is kept.

The apportionment of 90% and 10% as between passengers and freight as percentages of expense of switching and kindred items is purely arbitrary and not based on any record of train or car movement, or any statistics. It was a matter of judgment and estimate as to the relative proportions of the switching in the two classes of serv-

Considering switching expenses, arbitrarily assigned on the basis of 10% and 90% as allocated, in our computation, 66.94% of the

total operation expenses were allocated in 1910.

There were a number of other items where an arbitrary basis of assignment was used to reach what we call direct allocations, e. g.: steam locomotive repairs, yard expenses, supplies for locomotives, including lubricants and fuel; fuel for road locomotives, so far as the locomotives were used in both passenger and freight service, fuel was apportioned to each service on miles run in each; we estimate same cost per mile for fuel for freight locomotives as for passenger locomotives, where locomotives are of the same size and type. figures heretofore produced indicate the cost of fuel per freight locomotive mile (19¢) to be considerably higher than per passenger locomotive mile (11¢). That is accounted for by the fact that heavier locomotives were used in freight service, where they are used almost exclusively or entirely in that service. We were working on the totals and not on individual locomotives when we got the figures of 10¢ and 11¢ for passenger mile for coal, and 19¢ for freight.

I think on the average, larger locomotives are used in freight than

in passenger, service.

I am not prepared to say that the cost per mile for coal is the same in passenger and freight service. The passenger train locomotives are lighter and the mileage in the freight is made more slowly than in passenger service.

Other items given as being directly allocated which were allocated on arbitrary bases, are the following: part of train supplies and expenses (under transportation); Industrial and Emmigration Bureau;

station employees; stationary and printing, traffic;

The C. M. & St. P., C. & N.W. and Soo Line are operating for 2¢ passenger fares in Michigan, as are also some of the roads in Wisconsin including complainant, since 1907; most of the roads in lower Michigan operate under 2¢ fares, there may be some small roads that

don't.

The items included by me as being directly allocated in the use of Complt.'s Ex. 41, Delf, on which some arbitrary basis was used, are same for years 1910, 1911 and 1912, except the Industrial and Emmigration Bureau. The percentages which I treated as allocated directly, which include those heretofore described as being allocated on arbitrary bases, are: 1910, 66.94%; 1911, 68.1%; 1912, 67.4%.

On Feb. 24, 1913.

DELF. recalled.

Further cross-examination.

By Mr. Wykes:

There is a separate dock charge, becoming effective Feb. 24, 1913, of 5¢ per ton, on ore, shipped within 10 days after arrival, and 1/4¢ per day additional for storage, if it is not shipped within 10 days. That has been added to the previous rates of 25¢ or 30¢.

More than 90% of our ore shipments pass over the Marquette docks and is given separately as interstate iron ore. Not more than 10 or 15% of the rail shipments are interstate.

The greater part of ore passing over the Marquette docks bears 25¢ rate, say 75% or 80%, the remainder bears a higher rate. The rates including dockage, have now gone to 30¢ and 35¢.

The rates at 25¢ and 30¢ have been in effect 7 or 8 years. Previous to 1895 or 1896, they were 30¢ and 32¢ or 35¢. There was material reduction when the L. S. & I. commenced operation about

(Agreement that all tariffs produced may be used without being introduced in evidence.)

Sheets showing maintenance expenses by divisions for 1912, for April 1911 and May 1911, produced, marked Defts.' Ex. 10, Delf. These apportionments were from reports rendered by road-masters on the various divisions and the expenses are all in the general

block "maintenance of way and structures."

I made a tabulation showing the average running time for passenger trains on Dec. 15, 1910 and June 30, 1911. On Dec. 15, 1910, the average running time for passenger trains between terminals was 22.4 miles per hour, which includes time occupied in making stops. On June 30, 1911, the average speed was 24.2 miles. The table showing speeds of various trains was marked Defts.' Ex. 11, Delf, and introduced in evidence.

This exhibit comprehends the movement between selected stations to show the higher speeds. The average speed of freight trains between terminals including stops was: Dec. 15, 1910, 10 miles per

hour; June 30, 1911, 10.7 miles per hour.

There is passenger service on the south line between Eagle Mills and Negaunee, but none Negaunee to Winthrop Junction. On the south track, Eagle Mills to Negaunee, there is a break or cave in at Queen Mine—there is no passenger service on that track. This is the old Marquette and Western line running through Queen Mine property to Negaunee. The trains which take the south line out of Marquette run over that track to Eagle Mills. They then take one of the new tracks of the north line into Negaunee.

(Witness states branches used exclusively in ore business, as follows:)

"The Negaunee mine branch, .21 of a mile; Negaunee and Palmer branch, 4.19 miles; Milwaukee branch, 1.74; Mary Charlotte branch, 1.39; Teal Lake branch, 1.39; Lake Superior mine pit .34; Lake shaft, .32; Winthrop mine branch, 1.94; American mine branch two miles; Champion mine branch, .98; Imperial mine branch, 1.03; Webster mine branch, .89; Beaufort mine branch, .72."

Side tracks of these branches would come under the same use as the branch. Wherever the word "mine" is used in connection with the siding, on Complt's Ex. 1, Riggs, they are mine sidings. There are quite a number of tracks at Marquette that mostly ore business

is done on.

The figures in our income due to mileage books are for the mileage as used. On June 30, 1912, we had out \$19,365.66 of mileage not used; I think the amount outstanding is increasing;

Operating ratios of the company from the reports to the State

Railroad Commission, follow:

	Michigan.	Entire line.
1910	 64.88%	68.72%
1011	 69.59%	72.07%
1019	 72.00%	75.98%
1012	 75.55%	79.83%
1919	 	

Our passenger train mileage includes mileage made on the Mineral Range by South Shore trains as follows:

1910		0			a	a	0								9	9	g	0				0		q	a	9			6	19,544	miles
1911	 			0						9				0			0		0						6	0	0		9	00,424	IIIIIICo
1912	 							0	0	ø								9	a	œ		w	9		0			0		9,912	innes

In each of the three years there was about 30,000 miles of passenger train mileage made on South Shore in Michigan, not included in our mileage figures, this being made by C. & N.

W. and C. M. & St. P. trains. Those trains were drawn by locomotives of, and had train crews paid by, those companies and the equipment belonged to them. The revenue came to South Shore. There were other trains on the C. & N. W. and C. M. & St. P. which were operated by D. S. S. & A. locomotives, and train mileage of those trains is included in our mileage.

DELF.

Redirect examination:

The property of M. H. & O. except 80,000 odd acres of land was deeded to D. S. S. & A. in 1900; the land grant lands owned by the D. S. S. & A. Ry. were deeded to trustees who, in turn, deeded them to South Shore Land Co., by whom they are now held. The stock of South Shore Land Co. is entirely owned by D. S. S. & A. In 1887 these lands were conveyed to D. S. S. & A. but in 1900 were deeded back to M. H. & O. and then deeded to trustees and by them to South Shore Land Co.

The time cards, chart, and train sheet referred to in McPherson's

testimony (Complt.'s Exhibits 61, 62 and 63) are the originals of

what they purport to be. I assisted in making the chart.

I prepared statements showing for 1911 and 1912 the percentages of card and coupon tickets which were interstate and intrastate. The percentages of all tickets sold which were intrastate were: 1911 and 1912, card or local tickets 98%, coupon tickets, 75%; and of the total of all tickets intrastate tickets was 94%.

In operating expenses are considerable sums which would be allocatable or approximately to intrastate, or which plainly appear chargeable to intrastate in greater proportion than the percentages suggested in the testimony for the division of Michigan passenger expenses between the intra and interstate passenger busi-

427 Wages of station employees, passenger trainmen, conductors, baggage-men and station employees in Michigan; passenger proportion 1910, \$37,119.96; 1911, \$41,033.33; 1912, \$40,-840.53. As 94% of the ticket sales by the employees were intrastate tickets it seems proper if we are endeavoring to allocate between inter and intrastate, to apportion 94% of their expenses to intrastate. It was divided on the revenue basis equated, 1910, 56% intrastate. As 85% to 88% of the total ticket or passenger fare collections made Ly conductors, were intrastate, and 84% to 88% of the passengers traveling on trains are intrastate passengers 84% or 88% of the wages of those trainmen should be assigned to the intrastate busi-There items were: 1910, \$45,189.58; 1911, \$49,969.53; 1912, \$52.275.23.

The fare reduction in Michigan of passenger fares from 4¢ to 3¢ was in Sept. 1907; since that time we have never made as many passenger miles as in 1907. That appears on Complt.'s Ex. 43, Delf, the passenger miles were: 1907, 33; 1908, 32; 1909, 32; 1910, 32; 1911, 32; 1912, 31; millions in each case. 1907 was the biggest year in the history of the company. Three months of the year ending 1908, were on the basis of 4¢ fare.

DELF.

Recross:

In 1907, the number of passengers traveling one mile was much more than in previous years. No subsequent year fell as low in passenger miles as any of the years previous to 1907. In 1907 the freight tone one mile increased 7 million tons over 1906, and the next two years, 1908 and 1909, the freight earnings fell off considerably and recovered again in 1910. In 1907 the passenger miles increased approximately 41/2 million miles over 1906. In 1910 the

passenger train miles almost recovered to the point of 1907. 428 The average received per mile per passenger has been the following: 1906, 2.825¢; 1907, 2.785¢; 1908, 2.59¢; 1909,

2.541¢ 1910, 2.543¢; 1911, 1.519¢; 1912, 2.551¢.

It is the general impression that 1907 was a good railroad year

all over the country, and better than the next two years.

Ticket agents do other things besides sell tickets; some are telegraph operators, they carry mail to post offices, bill freight, make all 429

necessary repairs, sell accident insurance; sell pullman tickets, act as agents for telegraph and the express companies, build fires, check,

load and unload baggage.

I applied the percentages derived from the sale of tickets only to passenger proportion of compensation. In the sale of tickets for our line we have card and book tickets; the running and terminal times of the trains and prices for the tickets, are all known to the ticket seller and it is simply a matter of reaching around and getting the ticket and passing it out, and the inquiry with regard to the time of the trains is very briefly answered. Where the agents sell tickets off the line to foreign lines, it in instances consumes a good deal of time to look up the time and the connections and incident things.

I treated the salaries of station employees as common and divided between inter and intrastate on equated basis, that was on the theory that there was such a small part of the operating expenses that can be separated between inter and intra business that it was a fair proposition to divide the total passenger expenses between the inter and intrastate as we have done it, without trying to allocate any; where error occurred in one instance it was offset on the other side. It is not possible to reach a mathematical or a close determination of the amount of time of the ticket agent used in the interstate or

in intrastate service. The average number of cars per train mile on the South Shore were as follows:

																						Passenger train cars.	Freight train cars.
1908							6	0	0						0	0	0	9		0		3.98	17.19
1909		9								0	9				0							4.27	16.55
1910	0	9	9	9	9	0		9				0		9	9	0	0	0	0	4		4.33	17.36
1911	0			9			9		9	0	0		0	0	0	0	0	0	9	0	0	4.42	$\frac{18.41}{18.69}$
1912				9			9	0	0		0		0					0		9	0	4.52	19.09

On April 22, 1913.

Delf, recalled.

Further direct examination.

By Mr. Butler:

(The witness produced a statement containing separation of certain operating expenses by divisions, for the years 1910 and 1911.) The Western Division as shown on these sheets, comprices the division Nestoria to Superior. The statements are as follows:

430

Division of Certain Roadway and Track Expenses, Year Ending June 30th, 1910.

	Mackinaw Division.	Houghton Division.	Western Division.	Total.
Superintendence	\$5,857.22	\$5,320.17	\$6,151.95	\$17,329.34
Ballast	1,134.12	513.50	857.17	2,504.79
Other Track Material	8,316.69	13,922.59	7,165.08	29,404.36
Roadway and track:				
Applying Ballast	2,711.63	207.30	1,821.25	4,740.18
Ties	18,127.16	12,446.39	21,288.79	51,862.34
" Rails	3,538.00	3,595.06	1,251.21	8,384.27
" Other Track Material	1,318.16	1,374.00	268.50	2,960.66
Track Maintenance	50,069.63	36,979.11	53,222.04	104,270.78
Care of Roadbed	723.30	1,169.60	6,949.90	8,842.80
General Cleaning	5,121.33	3,640.40	7,806.55	16,568.28
Partolling & Watching	7,594.66	6,251.47	5,122.78	18,968.89
Changing Alignment and Grades	55.65	13.50	1.50	70.65
Bank Protection	22.74	241.60	137.70	420.04
Filling	7.30	3.81	72.50	83.61
Other expenses		60.00		00.09
Train Service	2.318.39	1,846.88	5,590.92	9.756.19

Duluth, South Shore & Atlantic Railway.-Continued.

Total.	28,222.89 448.50 5,642.39 17,302.55 9,139.82	\$354,685.69 574.54 \$618.00
Western Division.	4,286.74 176.92 1,981.36 6,948.87	\$131,065.91 216.96 \$604.00
Houghton Division.	10,589.43 157.45 1,915.59 7,131.22 4,926.54	\$102,452.63 145.31 \$704.00
Mackinaw Division.	13,346.72 114.03 1,745.44 3,222.46 4,177.48	\$121,167.15 212.27 \$571.00
	Removal of snow, Sand and Ice	Mileage of main line and branches maintained on June 30th, 1910

Duluth, South Shore & Atlantic Railway Company.

Division of Certain Roadway and Track Expenses, Year Ending June 30th, 1911.

\$5,557.69 \$5,024.83
77.52 10,215.27
996.65 738.85
00
1,403.06 1,376.53
37
-1
15.50 163.60
1.00 59.50
95.00
17,992.70 15.297.21

Duluth, South Shore & Atlantic Railway.—Continued.

Total. 284.39 5,480.88 16,195.03	\$345,453.29 575.05
Western Division. 41.10 2,023.97 3,478.95 512.80	\$127,536.77 217.88 \$585.00
Houghton Division. 41.29 1,703.37 9,280.07 7,158.88	\$101,217.95 145.31 \$697.00
Snow & Sand Fences & Snowsheds. 202.00 Roadway Tools & Supplies. 1,735.54 Maint. Jt. Trks. Yds. Fac.—Dr. 3,438.01 Maint. Jt. Trks. Yds. Fac.—Cr. 3,534.91	Mileage of Main Line and Branches Main- 211.86 tained on June 30th, 1911

432 These were prepared for the same purpose and in the same manner as the previous statements for 1912 (Defts.' Ex. 10.

Delf)

(Witness produced, and there was introduced, a compilation (Defts.' Ex. 13, Delf) showing the speed of freight trains for June 30, 1911, and Dec. 15, 1910. These are the same days covered by the statements previously given for passenger trains. This covers freight movement between the same points as listed for the passenger trains, as far as I could make it up. I don't know that it covers all the freight train movements. I found none showing train movements faster an these. I gave instruction to put in the highest movements. Defts.' Ex. 6, Maney, prepared by me, is a statement of earnings than these.

per train. The method of arrival at the mail and express earnings

shown on the exhibit was by arbitrary apportionment.

The 90% and 10% for the division of the costs of yard locomotive employees and enginemen was on the basis that we had always used since we have endeavored to make a division of operating expenses between passenger and freight business, back in 1894, and prior to that time, when I. C. C. required us to divide those expenses in our re-The assumption was that that represented the time of men employed in the two different services.

Q. The expense of the maintenance of the property that is used by the locomotive that is divided on the basis of 10% and 90% should also be divided on the basis of 10% and 90%, should it not, if you could separate that expense from the expense of maintenance of main

line, assuming that the 10% and 90% is proper?

A. I don't think so.

Q. Your idea was that the switching movement was 10% for the passenger service and 90% for the freight service, and that switching movement uses the sidetracks; if your percentages are 432a right in the proportion of 10 and 90, that is true, isn't it?

A. Yes.

Q. Why, in addition to dividing the expense of the men who operate these locomotives on the ratio of 10% and 90%, do you not also divide the expense of maintenance of the tracks over which the operation is carried on?

A. Because that maintenance comes under the general maintenance item of accounts, it is not kept separate, and the general maintenance accounts are divided on the revenue train mileage basis.

Q. The revenue train mileage basis for certain years throws 48% of the cost of maintenance into passenger departments?

A. Yes. Q. When, as a matter of fact, your observation leads you to the conclusion that the switching operations over those sidings is on the basis of 10% and 90%?

A. I don't see that that is a question at all. That last part, there,

is a statement.

Q. The purpose of your division, Mr. Delf, in your assignment of expenses, was to get a fair assignment as between passenger and freight?

A. All expenses, yes, and I have endeavored to be both fair to the

passenger and freight departments.

Q. If the operation over the tracks over which switching is carried on is on the ratio of 10% to passenger and 90% to freight, why would it not be fair, and why is it not proper, to divide the expense of maintenance of those tracks upon that ratio, rather than upon the ratio of

48% and 52%?

A. Rather than upon the revenue train mile basis? In di-4326 viding the total expenses, including the maintenance of these yard tracks, on revenue train miles, there are certain portions of these yard expenses that is apportioned to the freight business that should be properly apportioned to passenger business; that is the time occupied by freight trains on sidings waiting for passenger trains to pass by, and it seems to me that, taking the whole question and all other things into consideration, you get a fair and equitable result, rather than trying to divide the maintenance expense of which we have no record on this 10% and 90% basis.

Q. Then it gets back to this, although you are satisfied in your own mind that those sidings are used by the freight and passenger trains on the basis of 10% and 90%, and there you have somewhat of a close method of apportioning that expense of maintenance between the two different departments, you take, rather, the general division

on the basis of revenue train; that is true, is it not?

Mr. Butler: The maintenance is not kept separate, and has never been, and cannot be.

The Master: Well, should it be; that is the point?

Mr. Butler: I don't think it can be; I don't see how it can.

The Master: The reason it is on a different basis is because it is impossible to tell what it is or because that is the proper basis?

A. That is what we have done.

Q. And in your mind you justify that with the general claim that the freight train has to wait on the siding for the passenger train?

A. No, not on that alone. For all the reasons brought out in this case as to the items of expense now charged to freight trains, properly chargeable, if we could arrive at them, to passenger trains.

Q. All those reasons were referred to for the purpose of 432cjustifying the use of the revenue train mile basis for division of common expenses, where the revenue train mile was made by two different kinds of trains, and the reference to those different items, such as waiting for passenger trains, was to offset the greater weight and the greater number of car wheels and the greater length of train and the greater tractive power required in the freight service; that is true, is it not?

A. I don't know that it is in regard to all of those items.

Q. What I want to know is what justification there is for applying that general and somewhat indefinite method of division on the revenue train mile basis, which throws 48% into the passenger service and 52% into the freight service, when you are satisfied that a large part of the expense is incurred on switching tracks, where the operation is on the basis of 10% and 90%?

A. I think I can only repeat my former answer, that the revenue train mile basis seems to be the only basis that can be fairly used in

dividing the common expenses.

Q. You wouldn't say that it was proper to use the revenue train mileage for a part of it, where observation and experience of a good many years and the practice of the company has indicated a different ratio of expense in the different services, would you?

A. I think you have to view that situation as a whole, not by piecemeal, and that it does, then, give a fair division, the revenue train

mile basis.

432d

Q. In addition, on South Shore, you have a good deal of mileage not used at all in passenger business?

A. Yes. I think it is 62 miles.

Mr. Butler: Of spurs and sidings. A. Yes, those industrial branches. The Bessemer Jct. mileage is included in these branches—in that 62 miles.

Q. There is the Humboldt to Republic branch?
A. There is passenger operation on that.
Q. There is one car one way once a day?

A. There is a daily train. The mileage from Eagle Mills to Win-

throp Jet. is included in the 62 miles.

Q. Wouldn't it have been fair, Mr. Delf, to have laid aside the expense on that 62 miles for maintenance before you attempted to apply to all of the expenses the revenue train mile basis?

A. It couldn't be done. You don't know what the expenses are,

and couldn't have added them.

Q. It couldn't have been done to a penny, but it could be arrived at by the use of some more or less arbitrary method, could it not? A. You could use an arbitrary method and lay it aside, yes.

The Master: Could you have estimated it substantially?

A. I have testified that the maintenance of those tracks is not over

a third of what it is on the main line per mile.

Q. If you could have arrived at the expense of maintenance of that part of the track not used in the passenger business, you would have located it directly to freight, would you not, before applying your revenue train mile basis?

A. No, I don't think I could.

Why not?

A. Because it would bring in so many other items that you might endeavor to allocate in that same way that you would get so many estimates in that your results would be practically of no value.

432e Q. Why would they be of no value? Isn't the thing we are after an allocation of expense between passenger and freight? And tell me why, the closer you locate, we are not getting the most accurate results-why, if we get closer to the point in view than you have gotten, your results would be of no value?

A. When you eliminate these items that you would apply an arbitrary or estimated basis to, and then apply another basis, which the revenue train mile would balance, you haven't a proper factor for dividing the balance. I have testified that there is no revenue train

mileage of the road made on this 62 miles; if there is any, it is a very small fraction of one per cent.

Q. Now, then, why is any equation disturbed by first eliminating the expense of maintenance of this property used exclusively in

freight business?

A. You would have to then add something to your passenger percentage to take care of those other factors that you have brought in; where the freight expense is charged to a portion of the passenger expense, you would have to bring another arbitrary in there to offset that.

Q. You mean to tell me that this track and the expense on this track not used in the passenger business has been mentioned in this case as one of the elements justifying the use of the revenue train

mile basis?

A. No.

Q. Suppose, instead of its being 62 miles used in the freight business exclusively, it had been one-half the road,-one-half the mileage,-would you still say that the revenue train mileage basis should be used?

A. Well, that would change the entire situation.

Q. Then, to what point would you go before you said that the revenue train mileage basis should be abandoned?

A. I am not prepared to say.

Q. Now, you have examined certain other cases, Mr. Delf, 432f where the revenue train mile basis for the division of common expenses has been used, have you not?

- A. Yes. Q. Do you know whether it appears in the record, or does it, to your knowledge, appear in the record, of any of those cases that there was a mileage used exclusively in one department of the service?
- A. I don't recall any of them, whether that was gone into or not. Q. Will you give us the various reasons upon which you justify the use of the revenue train mile basis for the division of common expenses?

A. Because I believe it most fairly represents the use of property in

the two classes of operation, in every way that it is used.

Q. Does it represent the use in point of time. A. Time is an element that enters into it.

Q. Then you wouldn't care to say that it represented the use in point of time alone?

Q. Because, due to the fact illustrated by the tables this morning, and a similar table the other day, the slower moving train does use the track for a greater length of time and requires exclusive use for a greater length of time than the passenger train; that is true, is it not?

A. I think the passenger trains are on the track just as long as the freight trains; not on any individual piece of track, perhaps; a freight train takes longer time going over the track. Taking the railroad as a whole, the passenger trains are on just as long as the freight;

they are on the track all the time, and so are the freight trains.

4320 Q. Standing in the yards part of the time; that is the reason for the answer that they are on the track all of the time, is it not?

The Master: You mean they are in motion all of the time?

Mr. Wykes: I believe I stated that the freight trains occupied the tracks longer than the passenger.

The Master: Do you mean while they are in motion?

Mr. Wykes: If your honor please, this is exactly what I mean: When a freight train is on the track, on the main line, it uses a certain part of the line for a certain length of time in exclusion of all other service. It has the exclusive use of the track during the time that it is on it; that is true, is it not?

A. That is true as to each class of trains.

Q. And the slower moving train, of course, consumes a greater time in getting over the track between terminals; that is true, is it not?

A. Between the same terminals, it would be, yes.

Q. And between the extreme terminals of the road, also; that would be true, would it not?

A. Yes. Q. And, for that reason, uses the track for a longer period than

faster moving passenger trains?

A. It is on the track between terminals—between the points it is running-a longer time than a passenger train would be between the same points.

Q. And that comprehends an exclusive use of the track for a

longer time than the passenger train would use it?

A. I don't think it has the exclusive use of all of that track between those terminals.

432hQ. I am not talking about all the track between the extreme terminals. Take, for example, Mr. Delf, a freight train leaving Soo Jct., going towards Newberry, would have the exclusive use of the track between those points, would it not?

A. Not necessarily.

Q. It would of the track in front of it?

Mr. Butler: For how long?

Mr. Wykes: Until it reached the other terminal-until it reached Newberry.

A. There might be a passenger train right in front of it, going the same direction; there is no station between Newberry and Soo Jet. about seven or eight miles.

Q. There might be two freight trains in that seven or eight miles? A. Yes, or one passenger train, and one freight train leave im-

mediately after it.

Q. But the passenger train made that mileage at the rate of something like 35 or 40 miles, according to your tabulation; is that cor-You have it before you, I think.

A. The freight train ran 20 miles an hour in there.

The Master: Supposing a freight train mile consumes twice as

much time as a passenger train mile, what effect would you give that in apportioning operating expenses, if any?

A. I wouldn't give it any.

Q. What other element besides the element of time did you consider in determining the revenue train mile basis to be proper?

A. I think I can only state that generally as the use of the prop-

erty by the trains.

432i Q. The use of the property?
A. Yes, the general use of the property by the trains.

Q. Isn't it a fact that the freight train is much heavier than the passenger train?

A. As a whole, sometimes it is.

Q. Well, as a rule?

A. I think so.

Q. Isn't it a fact that the number of cars in a freight train is much greater than in a passenger train?

A. Yes.

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Q. Three to five times, on the South Shore?
A. Somewhere there, from two to four times.

Q. And isn't it in addition a fact that there are many more wheels and wheel impacts in the movement of a freight train than in the movement of a passenger train?

A Yes

Q. And isn't it also a fact that greater tractive force is required to move the greater weight?

A. Greater tractive force is required to move the greater weight.

Q. Now as against that, all of which would create a higher ex-

pense per train mile in the freight department than in the passenger department, two items have been mentioned in this case, one is the greater speed of the passenger train and the other is the fact that the freight train waits from the passenger train,

Q. Now, per train mile, what are the things that make for the

higher cost in the passenger service, in your judgment?

A. One is the item of freight trains waiting on sidings for passenger trains, the high speed of the passenger train, the elevation at curves to take care of that, the removal of snow and ice, a great deal of it is done to clear the track for passenger trains, that wouldn't be done if freight trains only were moved.

Q. Is that all?

A. Those are the principal ones that occur to me now.

Q. Now, the element of removal of snow and ice is a small item isn't it?

A. From 28 to 38 thousand dollars a year.

Q. You don't mean to say that none of that would be done if it were not for the passenger service?

434 A. No.

Q. You mean you get to it a little quicker because of the passenger service, you would have to remove it anyhow but wouldn't remove it quite as quickly and wouldn't be attended with quite as much expense?

A. There is a lot of extra expense put into that item to clear the

track for passenger trains, that wouldn't be done if we could let traffic lay until the storm was over, clear the track when that occurred.

Q. Have you ever made any computation to find out how much that was?

A. No, I cannot estimate it.

Q. And when you speak of the elevation of curves do you mean the cost of elevating?

A. No, the wear and tear occasioned by the elevation and the mov-

ing of freight trains over them.

Q. Have you ever made any computation to find the cost of that?

A. I have not.

Q. You are not an engineer? A. No.

Q. And you don't give an opinion on this from an engineering standpoint?

A. No. Q. Simply from the standpoint of what you have noticed by going over the roads since you have been Auditor there?

A. Simply from general observation in my connection with the

railroad work.

Q. But the accounts themselves do not furnish anything to indicate to you that there is a greater expense due to the passen-435 ger service?

A. No, the accounts don't indicate any of these things.

Q. Nor the extent of it?

A. No.

Q. How do you know, Mr. Delf, that these four items that you have mentioned, the speed of the passenger train, the waiting of freight trains for passenger trains, the removal of snow and ice and the elevation of curves, how do you know that those items of extra expense due to the passenger service balance the extra items due to the freight service that we have enumerated here this morning?

A. I don't know that they balance.

Q. And yet they must approximately balance before you can correctly use the revenue train mile basis, must they not?

A. They should.

Q. Do you know how close they come to balancing?

A. No, I do not."

On Jan. 29, 1914.

DELF recalled.

Further direct examination.

By Mr. Butler:

I have prepared statements showing results of operation of complainant for fiscal year ending June 30, 1913. This statement containing 24 pages, marked Complt.'s Ex. 67, Delf, Jan. 29, 1914. Page 1, Complt.'s Ex. 67, Delf, mileage owned June 30, 1913 (similar to Complt.'s Ex. 31, Delf).

Pages 2-4. Complt.'s Ex. 67. Delf, shows revenue locomotive mileage, divided between states and between passenger and freight.

(Similar to Complt.'s Ex. 32, Delf.)
Pages 5-7, Complt.'s Ex. 67, Delf, revenue train mileage divided between states and between freight, passenger, mixed and special serv-

ice. (Similar to Complt.'s Ex. 33, Delf.)

No mileage made off the South Shore line is included in this statement of train mileage. The mileage of C. & N. W. passenger trains running west of Negaunee to Houghton over D. S. S. &

A. and of C. M. & St. P. running west of Champion over D. S. S. & A. are included. The mileage of C. & N. W. trains between Negaunee and Marquette and C. M. & St. P. trains between Republic and Marquette, and Champion and Marquette, is not included.

On C. & N. W. trains running west and east of Negaunee the

D. S. S. & A. receives all of the revenue.

On C. & N. W. trains Negaunee to Houghton the train and locomotive crews are employees of, and the locomotive belongs to, the

D. S. S. & A.

When the C. & N. W. train comes to our line at Negaunee, its employees and engine leave the train and our employes and engine take it to Houghton. The equipment, except engine, belongs to C. & N. W. or Pullman Co., and I believe consists of mail, baggage, and express car, a second class coach, first class coach, sleeper and diner.

The return of the same train, Houghton to Ishpeming, where it is passed over to C. & N. W. is in the same manner, it being handled both ways by South Shore crew and power. The C. & N. W. pays us 12.5¢ per train mile between Negaunee and Calumet to let that train The South Shore receives all revenue earned, go over our tracks. Negaunee to Houghton, and return, both through and local revenue between those points, getting the local rate on through business either way.

This train does local business between Negaunee and Houghton and South Shore gets and keeps all the revenue; this arrangement permits passengers to go through without change of cars at Negaunee; our company keeps the 12.5¢ per train mile for mileage of this train made on the Mineral Range, Houghton to Calumet.

The C. & N. W. also runs a daily train, Negaunee to Mar-437 quette and return; the entire equipment including engine belongs to C. & N. W. except Pullman sleeping car, and the crew is C. & N. W. The C. & N. W. pays us 10¢ per train mile for the running of the train, and the entire revenue earned, through or local, goes to the D. S. S. & A. In case of passengers from Chicago on that train, the C. & N. W. allows us revenue from Champion to Marquette, 31 miles, or 19 miles more than from Negaunee to Marquette. We get the local rate, Champion to Marquette, for business carried, Negaunee to Marquette; that rate is about 90¢ or about 3¢ a mile.

That train does a great deal of local business. The through fare is not charged, that is based on Negaunee, plus the local, Negaunee to Marquette, but owing to the chance that the C. M. & St. P. might have carried that passenger through Champion, the C. & N. W. allow us the Champion proportion, giving us the same amount we would

get from the C. M. & St. P., if it had carried it. The same rule would apply to a passenger going from Marquette by the same route to Chicago.

The mileage of the C. & N. W. train Negaunee to Copper Country, and return to Ishpeming, is included in train mileage shown on p. 7.

of Complt.'s Ex. 67, Delf, as far as Houghton.

The mileage of C. & N. W. train, Negaunee to Marquette and return, is not included in the passenger train mileage on p. 7, of Complt.'s Ex. 7, nor in any of our statistical figures.

"Mr. Eldredge: The reasons for the payments by the Northwestern, and they are the same for the payments by the St. Paul in a general way, are that the Northwestern desires to compete with the Chicago, Milwaukee & St. Paul railroad for business from Marquette and for business from the Copper country. It can only reach the

438 copper country or Marquette over the line of the Duluth, South Shore & Atlantic Railway Company, but it can reach the copper country and does reach the copper country not only over the South Shore but over the Copper Range.

Mr. Wykes: And the South Shore is in a position to dictate the terms of entrance of the Northwestern to Marquette and to Houghton

Mr. Eldredge: Yes."

For C. M. & St. P. passenger trains running over our lines, Champion to Houghton, and Calumet, we receive \$15 per day; that train consists of a mail, combined baggage and express cars, second and first class coach, sleeper and diners the distance traveled by this train Champion to Houghton is 63 miles, or 77 miles to Calumet the \$15 per day is for the round trip and our company keeps it all.

The D. S. S. & A. power and crew handle the train, Champion to Houghton, the train does local business, the D. S. S. & A. receives the revenue accruing between Champion and Houghton and its employees collect the local fare; on through tickets the C. M. & St. P. pays us the full local out of the through rate. This train mileage is included in the passenger train mileage on page 7 of Complt.'s Ex. 67, Delf.

The St. Paul trains run from Republic (Milwaukee Junction) to

Marquette and on return trip Marquette to Champion.

This train is daily, except Sunday, and comes from Milwaukee. The distance, Champion to Marquette, is 31 miles, and Marquette to Republic, 34 miles. The St. Paul power and crew handle the train. We receive all of the fares, both local and the proportion of the through fare accruing between the Junction with the St. Paul and the destination of the ticket; the train does local business between these points.

439 Of the through fares we receive the full local for the distance traveled on our line. The St. Paul pays us nothing ad-The St. Paul, Champion-Copper Country train carries a St. Paul company sleeper, on which our company pays no mileage. The C. & N. W. trains Negaunee to Copper Country and return to Ishpeming, handles a Pullman car both ways daily, but our company pays nothing for the use of it.

The mileage of the St. Paul train into and out of Marquette is not

included in the mileage on p. 7, Complt.'s Ex. 67, Delf.

On the return trip of C. M. & St. P. copper country train we retain the revenue from the origin of the ticket, on through tickets, to Negaunee. That distance is 19 miles more than the local fare to Champion; on a ticket of that kind, Houghton to Chicago, we receive \$2.48. The same rule would apply from points between Champion and Houghton. The through rate to the passenger is not increased; it is a mere question of division between carriers.

Pages 8-9, Complt.'s Ex. 67, Delf, car mileage, for year ending June 30, 1913, showing division between states, and between passenger and freight, and other classes. (Similar to Complt.'s Ex. 34,

Delf.)

The second item on p. 8, sleeping, parlor and observation car mileage, is the mileage of that class of cars, not owned by D. S. S. & A. The mileage shown at the bottom as sleeping and dining cars, is the mileage of those cars owned by D. S. S. & A.

Page 10, Complt.'s Ex. 67, Delf, operating revenue for entire line and for Michigan. (Same as Complt.'s Ex. 35, Delf.) It is made

on same basis as Complt.'s Ex. 35.

Page 11, Complt.'s Ex. 67, Delf, operating revenues in Michigan, divided between passenger and freight. (Similar

to Complt,'s Ex. 36, Delf.)

Page 12, Complt.'s Ex. 67, Delf, operating expenses for fiscal year 1913, by general accounts; (similar to Complt.'s Ex. 38, Delf.) This

conforms to and is based on I. C. C. classification.

Page 13, Complt.'s Ex. 67, Delf, tonnage statistics for fiscal year 1913. (Similar to Complt.'s Ex. 42, Delf.) The average interstate haul, 66,34 miles, is the average haul in Michigan on D. S. S. & A. of interstate freight; that is also true of the corresponding figure for prior years. I have not in any instance arrived at the average length of haul on our line on the interstate business touching Michigan, including the haul on our line outside Michigan.

Page 14, Complt.'s Ex. 67, Delf; passenger statistics for fiscal year 1913. (Similar to Complt.'s Ex. 43, Delf.) The average haul of interstate passengers in Michigan in this and similar exhibits for 1910, 1911 and 1912, includes no part of the journey of any such

interstate passengers, made outside of Michigan.

Page 15, Complt.'s Ex. 67, Delf, freight statistics in Michigan for fiscal year 1913. (Similar to Complt.'s Ex. 44, Delf, and made on same basis.)

Wherever iron ore is referred to on p. 15, Complt.'s Ex. 44, Delf, it refers to iron ore to Marquette dock, and includes none handled

otherwise.

The iron ore not going over the Marquette docks appears in freight, other than interstate iron ore. Other ore business is done in Michigan by the South Shore. In fiscal year 1913, 1,031,902 tons of ore was shipped over the docks, and over 100,000 was shipped that did not go over the docks.

Neither the tons or ton miles stated against ore on p. 15, 441 Complt.'s Ex. 67, Delf, includes any ore not passing over the docks: that is included in freight other than iron ore.

Page 16, Complt.'s Ex. 67, Delf, showing results of operation. (Similar to Complt.'s Exs. 45, 47 and 48, Delf.)

This statement corresponds with requirements of I. C. C. classification, but does not deduct interest on funded debt; it does allow estimated loss.

Item "arately operated properties" (loss) \$69,222.29. This is

due to operation of Mackinaw Trans. Co.

Page 17, Complt.'s Ex. 67, Delf, statement of operating results in Michigan. (Similar to Sheet 2, Complt.'s Ex. 45, 47 and 48, Delf.)

It is made on the same basis as the previous exhibits.

Page 18, Complt.'s Ex. 67, Delf, statement showing results of passenger business in Michigan, applying estimated loss and divided between intrastate and interstate. (Similar to Complt.'s Exs. 45, 47 and 48, Delf, sheet 3.) It is made on the same plan and basis as previous exhibits; there are slight differences as compared with 1910 and 1911; in those years we were unable to divide excess baggage between intra and interstate business actually; in 1912 and 1913 we divided actually.

Page 19, Complt.'s Ex. 67, Delf, equation for division of passenger operating expenses between intra and interstate business for 1913. (Similar to Complt.'s Ex. 46, Delf.) My testimony regarding

Complt.'s Ex. 46, would apply in principle here.

Page 20, Complt.'s Ex. 67, Delf, division of joint facilities revenue, between freight and passenger; it corresponds to Sheets 1, 2 and 3, of Complt.'s Ex. 35a and 36a, Delf; my testimony in connection with

those exhibits, as to method, would apply here.
Page 21, Complt.'s Ex. 67, Delf, rents paid joint facilities 442 divided between passenger and freight for 1913; corresponds to form of Sheet 2, Complt.'s Exs. 45a, 47a, and 48a, Delf, and the methods with regard to those exhibits would apply here.

Page 22, Complt.'s Ex. 67, Delf, hire of equipment, division between freight and passenger; this corresponds to sheet 2, Complt.'s

Exs. 45a, 47a and 48a, Delf.

Page 23, Complt.'s Ex. 67, Delf, rents received (joint facilities)

1913; corresponds to same Exhibits as page 22.

Page 24, Complt.'s Ex. 67, Delf, miscellaneous rents apportioned. This page also contains statement of outside operations, sleeping and dining cars, for 1913. (This sheet similar to sheet 2, Complt,'s Exs. 45, 47 and 48a, Delf.)

Generally speaking Complt.'s Ex. 67, Delf, is made on the same basis as the showing for the years 1912, 1911 and 1910, introduced in various exhibits, and furnishes a good basis for comparisons of re-

sults. (The exhibit is offered in evidence.)

Complt.'s Ex. 68, Delf, is an estimate of the effect claimed to be produced by the act complained of in this suit for year ending June 30, 1913.

The net loss shown is: intrastate \$127,790.65; interstate \$50,-745.43, total loss in Michigan \$178,556.08; the corresponding exhibit for previous years is Complt.'s Ex. 52; I believe they furnish a good method of comparison of the effect of the act for one year against the others.

"Mr. Butler: Exhibit 68 is offered in evidence.

Mr. Wykes: It is objected to as entirely speculative as not a subject for computation but as a matter which can only be determined by actual practice and actual experience and actually putting the rates into test."

Since being on the stand before I have prepared an exhibit showing the division of operating expenses, between states and between freight and passenger for 1910 by primary accounts, Complt.'s Ex. 45, Delf, simply gave the division by totals. This exhibit, marked Complt.'s Ex. 69, Delf, shows the same results as Complt.'s Ex. 45, Delf, sheets 2 and 3, but shows the details by primary accounts. This was prepared according to the rule indicated by Complt.'s Ex. 41, Delf, heretofore in evidence.

"Mr. Butler: Complt.'s Ex. 69, Delf, is offered in evidence.

Mr. Wykes: It is objected to as being based upon arbitrary assumptions which are not the fact, and on the ground that it does not make actual divisions where possible and that it does not make divisions in accordance with the facts."

Complt.'s Ex. 70, Delf, is similar to Complt.'s Ex. 69, Delf, except that it relates to fiscal year 1911; this divides operating expenses between states and classes of service by primary accounts. It is made on the same basis as Complt.'s Ex. 69, Delf, is the details of the totals shown on sheets 2 and 3, of Complts. Ex. 47, Delf, and is made according to the rule indicated by Complt.'s Ex. 41, Delf, (offered in evidence subject to objections stated for Complt.'s Ex. 69, Delf.)

Complt.'s Ex. 71, Delf, the same as Complt.'s Exs. 69 and 70, Delf, except that it divides the operating expenses by primary accounts for the year 1912. (Offered in evidence subject to same objections as

to Complt.'s Exs. 69 and 70, Delf.)

Complt.'s Ex. 72, Delf, similar to Complt.'s Exs. 69, 70 and 71,

Delf, except applying to fiscal year 1913.

complt.'s Ex. 73 is a statement of the freight traffic movement in Michigan for the fiscal years 1910 to 1913 by commodities, showing the freight which originated on this road, freight received from connecting roads and other carriers, and the total tonnage, and the percentage of each to the total. This classification of commodities is that prescribed by the Railroad Commission of Michigan, except that I have made a further subdivision by dividing the item "ore" so as to show the ore to Marquette docks as a separate item, that being an entirely interstate movement.

There are four different points of origin for freight. Part of it originates on the D. S. S. & A. Railway in Michigan, part on the D. S. S. & A. Railway in Wisconsin, and part is received from other carriers at Michigan junctions, and part is received from other carriers at Wisconsin junctions. Freight originating on our line in

Michigan is either delivered to consignees in Michigan on the D. S. S. & A. Ry. or delivered to other carriers at Michigan junctions, or carried into Wisconsin by the D. S. S. & A. Ry. Freight originating on our line in Wisconsin is either delivered to consignees in Michigan on our line or delivered to other carriers at Michigan junctions.

Freight received from other carriers at Michigan junctions was either delivered to Michigan stations on our line or delivered to other carriers at Michigan junctions, or carried into Wisconsin by our line.

Freight received from other carriers at Wisconsin junctions was either delivered to Michigan stations on our line or delivered to

other carriers at Michigan junctions.

I have ascertained from the records of my office the Michigan intrastate tons received from each of the four classes of sources, and also the disposition of the same. I have ascertained like information concerning Michigan interstate tons.

443bComplt.'s Ex. 74 is a statement prepared to show the stational service given to freight other than ore to the Marquette

docks for the fiscal year 1913 in Michigan.

The freight which enginated on our line in Michigan and was delivered to consignees of our line in Michigan is all intrastate and received two stational services, one at the point of origin and one at the point of delivery. The stational service given to the intrastate tons of this class would be represented by the number of such tons

multiplied by two.

The unit of service being the local service given in originating or delivering a car load shipment, which we will call a full terminal service, it was calculated that the service given at a junction point, of receiving from or delivering to another carrier a like amount of business, was one-fourth of the service given to the local business. Using that as a factor, shipments which originated on our line in Michigan got one full terminal service at the point of origin and 25% of one full terminal service at the point of delivery to the other car-Multiplying the total number of tons so originated and so delivered at a local junction point by 1.25 gives the volume of service This does not relate to, and is to be distingiven to the business. guished from, the service of movement along the line, and is not affected in any manner by the distance the shipment moves along

Freight originating on our line in Michigan and carried by us into Wisconsin is all interstate and gets one full stational service at the

point of origin.

Freight originated on our line in Wisconsin and delivered to consignees in Michigan on our line is all interstate business and received one full terminal service in Michigan at the point of delivery.

Freight originating on our line in Wisconsin and delivered to other carriers at Michigan junction is all interstate business 443c and received 25% terminal service at the junction point in

Michigan.

Freight received from other carriers at Wisconsin junctions and delivered to Michigan stations on our line may be either intrastate or interstate, depending upon its place of origin. Such freight received a 25% stational service at the junction point where it was received from the other carrier and one full stational service at the

point of delivery in Michigan.

Freight received from other carriers at Michigan junctions and delivered to other carriers at Michigan junctions includes both intrastate and interstate freight and received a 25% terminal service at the junction where it came on to our line and the like service at the junction where it left our line, making a total terminal service of 50%.

Freight received from other carriers at Michigan junctions and carried into Wisconsin by our line is all interstate business, and received a terminal service at the junction where it was received only—

a 25% service.

Freight received from other carriers at Wisconsin junctions and delivered to Michigan stations on our line received one stational

service in Michigan at the point of delivery to the consignee.

Freight received from other carriers at Wisconsin junctions and delivered to other carriers at Michigan junctions is all interstate business and received a 25% stational service at the point of delivery at the Michigan junction.

Exhibit 74 shows that the proportion of the terminal service given to the intrastate freight to the total is 55.3%, and to the inter-

state 44.7%

Complt.'s Ex. 75 is a statement of the freight train mileage in Michigan for the fiscal year 1912, mileage of ore trains between Marquette and the mines not included. That mileage is shown by three classes of trains, local freights, time freights, and extras,

three classes of trains, local freights, time freights, and extras, and is divided into two classes of service, called stational service and road service. 50% of the local freight mileage or time of service has been assigned to the stational service, 20% of the time freights, and 25% of the extra freights. Of the total service so divided, the result shows that 32.2% is stational service and

67.8% is road service.

These percentages which I have used as to the proportion of stational work done by the different trains is obtained from the testimony of Mr. Lytle and the conductors and confirmed by my own opinion. I am familiar with the operation of the trains, and it is my opinion that the percentages are conservative and low as to the proportion assigned to stational work. I am sufficiently familiar with the amount of traffic and the work at interchange to compare the amount of service required and the average interchange at junction points with the amount of service required on the average to receive or deliver freight from consignors or to consignees on our line.

Before I became auditor of the road, I was agent at a junction point, and handled the interchange work there, and also the local work, and I am familiar with the physical condition at the various interchange points in Michigan. In my opinion, the average volume of work or service required in receiving or delivering at interchange as compared with receiving or delivering at a station of origin

or destination on our line is less than 25% at the point of inter-

change compared with that at the point of origin or delivery.

Complt.'s Ex. 76 is a statement of the operating expenses in Michigan by primary accounts for the fiscal year 1912, showing, among other things, the operating expenses on freight other than ore to Marquette docks subdivided into three parts, the first being that part not separated as to road and stational expenses, the next into road expenses, the third part into stational expenses, and a final division on the exhibit of the expenses between the intrastate and interstate freight business.

443e We are not required to keep separate account of the expense of movement of ore to the Marquette docks, but we have kept that expense separately for the calendar years 1911, 1912 and 1913. We did that for the purpose of justifying an increase in our ore

tariff in a matter before the Interstate Commerce Commission.

In preparing Ex. 76, it is found that certain freight expenses assign themselves between road and stational. For instance, the items in the maintenance of way and structures account are not divided between road and stational, whereas such an account as Station Employees, and the account of Yardmasters and their Clerks, are all stational. Out of the road accounts, including the wages of the freight train employees, fuel, etc., I assigned 32.2% to stational on the percentages arrived at in Ex. 75, which, in my opinion, is a fair and just way to make such division. A similar division was made of certain of the expenses under the head of Maintenance of Equipment.

In dividing the freight expenses between intrastate and interstate, we assigned all expenses under the head of "Not Separated as to Road and Stational" between intrastate and interstate on the relation of the intrastate and interstate ton miles to the total. We assigned the items under the column headed "Road Expenses" on a similar basis, this being the percentage most favorable to the defendants. The remaining column, "Stational Expenses," we divided between intrastate and interstate on the percentages arrived at in Ex. 74, assigning 55.3% to intrastate business and 44.7% to interstate business.

The general expenses were then divided between intrastate and

interstate freight on an overhead basis.

I had these figures carefully made up, and gave it a lot of study, and I believe that it arrives at a fair result in the division between intrastate and interstate business.

Complt.'s Ex. 77 shows the Michigan freight revenue for the fiscal year 1912 divided between intrastate and interstate, the freight operating expenses divided between intrastate and interstate, and the net freight revenue from the intrastate and the interstate business.

Complt.'s Ex. 78 is similar to Ex. 76, except that it is for the fiscal

year 1913.

Complt.'s Ex. 79 is similar to Ex. 77, except that it is for the

fiscal year 1913.

Complt.'s Ex. 80 is similar to Ex. 75, except that it is for the fiscal year 1913.

(Complt.'s Exhibits 73, 74, 76, 77, 78, 79 and 80 introduced in evidence subject to the objections that they are based on arbitrary assumptions and opinions, which do not represent and which are not the facts.)

The \$15,000 plus of balance for rental of equipment would be entirely account of interchange equipment. With a foreign freight car interchanged to and coming on to our road loaded with freight, I would first get a junction report rendered me, which would come each day, showing all of the cars, way bill numbers, and where billed from and to. If the car was going to a destination on our line, some days later I would get the original way bill, which accompanied the car, sent in by the agent at destination point. After the close of the month, I would get an abstract from the agent at destination, showing an abstract of that and all other way bills he had received. It would probably be an interline bill. We would check that rect would apportion the revenue between the lines to whom it belonged. It might be several lines. We would make a report covering all the business received from any one road for the month; they would make a similar report of all freight business received from us during the same month; the difference or balance would be

paid to the road to whom due. We would have to have an accounting with as many companies as the way bill read over,

In getting the empty cars back, we endeavor to get the cars back as soon as we can with a load; if we have not the business for it, we would have to send it back empty; the rule is to get it back to the same point from which we received it. I don't know the relation of empties to loads at interchange points. The empty movements at the junction point may be on local business. We endeavor to use our own cars and dispense with the use of foreign cars as far as we can. We sometimes have differences with other companies in regard to balances for freight business, which results in correspondence. It is work done and has been got down to a pretty good system, eliminating a great deal of correspondence.

The division sheets, for dividing freight revenue between participating companies, are prepared by the general freight agent, and if a new division goes into effect he sends me a notice, just the same as he would of a new rate. The division sheet is usually made by the line originating the traffic. The arrangement for division is made between the traffic officers of the two roads, which may be the result of a number of conferences and correspondence, and, after it is determined what the division is to be, one road or the other issues the division sheet. Those divisions are not changed much after once established, and our divisions with certain roads have been in effect,

with very little change, for 15 years or more.

The proportioning of tariffs covering business on to and off our lines is, I should judge, a somewhat intricate matter. Those are filed with the I. C. C., which sometimes does not agree with the rates and now and then they suspend them. In fixing the local tariff, the complication of taking into consideration the rates of other

443h roads is avoided. Sometimes a local tariff is affected by the tariffs of other roads, where there is competition. I think,

though not based on experience, that it is perhaps as difficult to make

a local tariff as one in connection with other roads.

I understand they ascertain from the other roads what their rates are, or what they are willing to participate in, and issue a tariff; this is probably done by letter. In making the local tariff, they must ascertain the rates of the other competing carriers, to know how to make a rate to secure the business.

The operation on an interchange shipment delivered to the Canadian Pacific at the Soo would be that we would deliver the car, accompanied by the way bill, on the interchange track, and the switching crew would take it across the bridge and deliver it to the C. P. R. That being treated as our business, we would pay cost of transfer. Business coming from C. P. R. to us is treated as their business. When we get cars from the C. P. R. into the Soo yard, destined to points on South Shore, the switching crew makes them up into trains,

ready for the road engine.

The stational expenses, separated before division of freight into interstate and intrastate, comprise all of the expenses incurred at terminal points of the freight, where freight originates or is delivered, such as switching by train crews, dropping and picking up cars, unloading less than car load freight, the expenses of the station force in loading, unloading and checking freight, and in billing, expensing, collection of the charges, receiving orders for empty cars, procuring those cars, and notifying transportation officials when they are ready to be taken out from the point where loaded; and all work by station employees and train crews at stations in connection with the freight traffic.

I got this idea of setting aside the stational cost by a study of the situation. I know of no other case where it has been done.

443i The delivery point for our road on cars delivered to C. P. R.

is on the Canadian side at the Soo. The distance across the river to be made by the switching locomotive to get the cars to the point of transfer would be a little over a mile. Our trains would stop at St. Mary's transfer, and the switching account locomotives would break up the train. In getting those cars across to the C. P. R., one of the most expensive bridges we have is used.

The cost of transfer would be about \$1 a car. Only 29½% of that bridge is in Michigan, and only that part of the expense is charged into the Michigan expenses. It is paid by the company, but it doesn't enter into these exhibits showing the Michigan operating expenses. It is a cost of making the transfer which we have to

pay to get the business to the C. P. R. at Soo, Ont.

At St. Ignace, the greater part of our interchange freight goes over the Mackinaw Transp. Co. ferry. We consolidate a good deal of freight into car load lots at St. Ignace. As far as practicable, north-bound freight destined to points on Soo Line would be consolidated by South Shore at St. Ignace and delivered to the Soo Line in the cars without transfer at Trout Lake. It might come to our line over the ferry in different cars, and those cars are unloaded and the freight that is to go to the Soo Line combined in a single

ear, or cars, so as to make car load shipments to deliver to Soo Line,

to prevent transfer of package freight at Trout Lake.

On Complt.'s Ex. 74, Delf, that business was treated as coming in The consolidation into car loads would take place at the freight station on the dock at St. Ignace. To make it, the cars must be taken off the boats by a switch engine and taken to the station; another car must be placed beside the freight station, into which that freight is put after it is unloaded; after it is loaded into the other car, that car must be taken and put into the train; the empty car might be taken away empty or might be loaded with other freight

depending on circumstances.

On freight on our line moving through St. Ignace, there is, if necessary, some consolidation of freight before it is delivered 443jto the Mackinaw Transp. Co. to be taken to the Michigan Central or the G. R. & I. If there isn't sufficient in the car that arrives at St. Ignace to make a transfer, and there is freight waiting there to go across, it would be consolidated with that freight; if there is enough in a car to go across, it would not be consolidated.

Freight originating on our line for delivering to G. R. & I. or Michigan Central, including that for which consolidation has taken

place, would be included in class 1b on Complt.'s Ex. 74.

The operation on a train through St. Ignace containing cars to be interchanged would be: Assuming 25 cars of freight, perhaps five or six of those would be for local delivery at St. Ignace and 15 for transfer across the Straits; the 20 cars would be set into the upper yard at St. Ignace by the train, which would end the connection of the freight train with the cars; the five cars for local delivery would be distributed to the various points; of the 15 cars per transfer, one or more might be less than car load, and, if not full enough to transfer across, would be switched to the freight house for consolidation; the balance of the car load freight, or bulk freight, would be switched directly to the boat. The freight we deliver to Michigan Central or G. R. & I. all uses that ferry, as does that received. I have never made a computation to ascertain whether the cost of transfer runs approximately \$1.50 per car. If the less than car load freight was in a Michigan Central car, for delivery to Michigan Central, we would turn it over, regardless of the amount in the car. If part was going to G. R. & I. and part to Michigan Central, we would separate it.

I have no statistics showing the number of empty and loaded cars using the ferry in 1913. As far as the ferry is concerned, a loaded

car is treated the same as an empty.

On a car coming to South Shore over the ferry at St. 443k Ignace, if it were car load or bulk freight, it would be switched to the upper yard and put in a train. if less than car load freight, and to be concentrated, it would be taken from the boat and the movement

would be as I have testified. At Houghton, in delivery of a car to Mineral Range, it is the practice to take that car with a South Shore locomotive across the arm of Portage Lake and deliver it in the Mineral Range yard at Hancock. That is a mile, or a little more. That service is paid for by Mineral Range. It is a cost of the Mineral Range incident to delivery. The

South Shore engine and crew runs through to Hancock, and the South Shore bills on the Mineral Range for the service, and the ex-

penses of the train from Houghton to Hancock.

On a car load shipment, business delivered to us at Sidnaw or Keweenaw Bay by a connecting company for delivery to a connecting carrier at Munising Jct., Sidnaw or Trout Lake would be under class

3b on Complt.'s Ex. 74.

Q. Under Mr. Lytle's testimony, a car of freight originating at Sidnaw or Keweenaw Bay would be picked up by a local and taken to Nestoria, and at Nestoria dropped by the local and picked up by the time freight. Assuming that I have stated correctly the operation at Nestoria, what train movement would there be for dropping it and for picking it up?

A. For dropping and picking it up where, at Sidnaw?

Q. At Nestoria. that is, the local would have to switch it out, break the train in two and switch it out into the sidetrack, would it not?

A. If your statement is correct as to that being the train, that

would be the movement.

Q. And then when the time freight came along, the time freight would have to stop and break up this train and pick it up, would it not?

443l A. Under the same conditions, yes.

Q. Now, the time freight would bring it through to Marquette, and, assuming it to be destined for one of these places that we have previously mentioned, these points of interchange in Marquette, it would be again dropped by the time freight, which would involve the same operation in taking it out of the train, the same operation in putting it into the local, from which it proceeds from Marquette to Munising Jct., Trout Creek (Lake), or any of those places?

A. Regardless of what train brought it into Marquette, they would have to drop it at Marquette, as none of the freights run through Marquette, whether it is local, time or extra, and a new train would

be made up at Marquette to take it through.

Q. What would be the stational operation in Marquette on that

car of freight, then?

A. The yard engine would have to switch it, put it into a train, provided the train that it came in didn't have all through cars; if it had all through cars, the train wouldn't have to be broken up.

Q. Assume that the freight was a time freight, coming into Marquette, and that this shipment was to be dropped at Shingleton. That would be taken by the local from Marquette, would it not?

A. I couldn't say what train it necessarily would be taken by.

Q. If it were taken by the local, and the train that brought it into Marquette were a time freight, it would have to be broken up, even

if it were a full train?

A. No, I don't think it would. If it were a full through train, it would be only a matter of putting another engine on to it and continuing the journey east, instead of letting the one that brought it into Marquette go along with it.

443m Q. But that assumes there would be no stop of that train at Shingleton, which was not in the question.

For illustration, the movement involved in our taking a car of freight from the C. M. & St. P. at Sidnaw: Our train would have to take it off the transfer track, where it had been left by the St. Paul, and put it into. If there was no other reason to stop at Sidnaw, but for this car, it would involve stopping the train; it would involve taking the locomotive, or the locomotive and some cars, from the train, backing into the siding or transfer track, hooking on to the car, and taking it out on to the track and uniting it with the train.

At Bergland, a car load of freight would stand on some siding or mill track; to pick it up, they would have to detach the locomotive, or the locomotive and some cars, from the train, back up to that car, connect with it, come out on to the main line and connect with the train. That is typical of all picking up of car load freight at stations where it is not interchange freight. The operation described for Sidnaw is typical of taking it from a connecting line, except at

St. Ignace and the Soo.

On shipments of telegraph or telephone poles to Oconto, Wis., over the St. Pf. I, through Sidnaw, if we haven't the empties, where there is a considerable volume of freight moving between certain points, it is often the practice to request the other company to furnish the empties. Those cars would come to us empty at Sidnaw. From Sidnaw, we would take them to the point where the freight originated; they would then be switched to the originating tracks. The shipper who wanted them would have to give us notice that he wanted a certain number of cars.

The operation with regard to ordering the empty cars would be the same as that where a shipper required an empty car for a single shipment which was not to be delivered to a connecting

443n carrier.

In Complt.'s Ex. 76, Delf, we have used 32.2% as representing the time of certain freight trains used in stational service. In applying that percentage to the item, Fuel for Road Locomotives, no distinction is made between the amount of fuel burned by a locomotive in stational service and in road service, making train miles. A part of the time spent by a train in stational service, the locomotive may be standing still. If they are switching cars, they have to keep their steam up to full efficiency, ready to hitch on to the train and start it, which takes more steam and energy, at that point, to start the train, than when running on the road. When a car is switching, it is not under the same load as when in motion on the track, but the locomotive is stopping and starting more frequently in making switching movements.

In getting stational part of repairs to equipment, we have assumed no difference in the movement of the cars in the train, and the movement in stational operation. It assumes an equality there, though, I think the greater repairs are necessitated by the switching and knocking around of the cars than the equipment gets on the road. However, in switching, they handle a single car or set of cars, and the rest stands on the track. It is the practice to make the train

up in station order, so that it is not necessary to handle the whole train when they are making switching movements. The cars being switched receive considerable wear and tear, while those waiting on the track receive no wear at all. The locomotive doing switching would undergo more strain than the normal road movement. You must start and stop it, and the change from inertia to motion creates the damage. I think there is no doubt that the switching movement would be a considerable item of expense in the wear and tear of cars, locomotive and track. I don't know whether it would approximate the road use. I do not believe any of the road locomotive switching was assigned to passenger service.

444 Compit.'s Ex. 81, Delf, statement of locomotive mileage in the several services for year ended June 30, 1913, and apportionment of value of locomotives. This separates Mr. Riggs' value for each locomotive in Michigan into each class of service on

the mileage pro rata, in each service.

Locomotives 552, 553, 554 and 700 to 711 inclusive have been put into use since June 30, 1913. I do not know whether 43 was in use before that. Locomotives 552 to 711 have been put into use

since June 30, 1913.

Locomotives 37, 38, 39 and 13 recently sold for, respectively, \$1,700, \$1,650, \$1,700 and \$1,200; 45 sold recently for \$2,000. We credited additions and betterments with the total cost, of \$13,000, for 37 and 39. For 37, 38 and 39, Riggs shows a present value of \$3,366 each. Locomotive 51 was put out of service and scrapped July 1, 1913.

The non-revenue mileage would include work trains, but no switching. In designation of classes, I. C. C. classification was fol-

lowed. (Complt.'s Ex. 81, Delf, offered in evidence.)

Complt.'s Ex. 32, Delf, statement of treasurer's monthly cash and bank balances, July 31, 1901, to June 30, 1913. The average yearly balance for 12 years was \$188,088.11; the average of the monthly balances by years was:

1902	\$52,990.72	1908	\$134,911.05
1903	77,812.41	1909	144,516.33
1904	147,868.05	1910	251,747.50
1905	302,580.37	1911	245,744.87
1906	249,286.11	1912	
1907	176,900.95	1913	205,536.21

Those figures were kept in the regular course of business. We pay our regular pay roll men twice a month, since Sept., 1913; formerly, they were paid once a month, about the 24th, for the preceding month. I believe these balances were fairly typical of the average balances during the month. There is no record of time in a given month for the payment for supplies and material; it has always been difficult to meet the payments as they become due. We are hard up for money; some payments are deferred after vouchers are passed and in treasurer's hands, as he hasn't the money. All company receipts are put into the bank as they come in, and

out of that bank account is paid interest on funded and un-445 funded debts, advances to other companies, and investments. The monthly pay roll is from \$120,000 to \$150,000, varying with the season.

DELF.

Cross-examination:

Our trackage changes more or less from year to year, tracks going in and being taken out and moved from one place to another; that is so of the spurs for traffic purposes; they were in miles: 1910, 49.48; 1911, 50.68; 1912, 62.14; 1913, 66.37; increasing a little all the time. Those are net and do not indicate the tracks moved in the period. The cost of moving such track, and the loss due to moving them, is charged to operating expenses under roadway and tracks.

A local freight, Marquette to Soo Junction, would produce in statistics 108 miles of locomotive mileage. This is the actual mileage be-

tween terminals.

A time or through freight or passenger train between the same point would show the same locomotive mileage, 108 miles. mileage would be the same as the locomotive mileage, assuming no double headers or pushers. Both the train mileage figures and locomotive mileage figures, are the actual miles run by the trains between terminals, except a small amount of mileage allowed the locomotives at the terminal in going to and from the roundhouse.

The revenue locomotive miles include nothing for road-switching; the time spent switching at a single point over one hour, would ap-

pear in switch locomotive miles.

The road or revenue locomotive miles between terminals would cover the switching done at the stations during one hour, e. g., Marquette to Soo Jet. the 108 miles, actual mileage would 446 cover the switching, no additional mileage put in for the

"Q. Then in the application of your percentage of freight and passenger locomotive miles to steam locomotives repairs and steam locomotives, depreciation to divide between passenger and freight, you have taken no account of that greater use of the freight locomotive in stational work, which is greater than exists in the passenger service?

A. In making that division there has been no distinction between the passenger locomotive mile and the freight locomotive mile. They have been treated on an equality. That is in all instances true of places where I divided expenses between passenger and freight on the

basis of locomotive miles.

Fuel for road locomotives under transportation expenses; we term that allocated; the total fuel furnished each locomotive is ascertained and divided according to the service in which the locomotives were engaged during the month, on the basis of locomotive miles. the locomotives ran in two services during the month that assumed the same amount and cost of fuel for making a locomotive mile in the freight service, as in the passenger service.

The amount of coal consumed per mile was:

	Cost, tons.	Freight, lbs.	Passenger, lbs.
1913	 \$2.96	141.30	82.28
1912	 3.12	126.46	76.86

Water, lubricants and other supplies for locomotives were divided between passenger and freight on the percentages found for the fuel, on the theory that those things would naturally follow the use of fuel and the amount of heat and power.

In division between passenger and freight, of expenses which I have divided on the basis of revenue train miles, I have taken the actual revenue train miles, and have not loaded the freight train miles

in any way for stational cost.

The switching locomotive miles (p. 4, Complt.'s Ex. 67, Delf) 357,998 for Michigan 1913, comprises the switching in the yards, and the road switching, where the time spent in road switching exceeded one hour.

Of the mixed train miles, of which on p. 6, of Complt.'s Ex. 67, Delf, 75% have gone to freight; that train does the same work as local freight, 50% of the amount of its time assigned to freight would

be engaged in stational work.

In assignments of expenses I have not, at any place, assigned any part of the expenses of the Marquette shops or incident to the maintenance of the tracks into, or grounds around, them to Wisconsin.

The maintenance of way, and structures items of expenses, Michigan proportion, have gone up materially in 1913 over 1912. The amount of M. of W. & S. expenditures in Michigan, were: 1913, \$581,520.42; 1912, \$454,032.33; 1911, \$418,276.45; 1910, \$423,-863.39. The increase of 1913 over 1912 was principally occasioned by ballasting and repairs of bridges, trestles and culverts, and roadway and track items. The new stringers put on bridges throughout system in Michigan were treated as repairs.

The ballasting in every year is charged to operating expenses, except where it is done on new construction. This is regardless of whether there is an improvement in grade of ballast or an increase of quantities; no portion of it is charged to additions and betterments,

and none ever has been on this line.

The addition of the new stringers in bridges would not produce a charge to additions and betterments unless the result of the addition brought the value of the structure above the original value. The fact of the increase in timber, in amount, unless it increased the

value of the bridge, meaning over cost new, would not be charged to additions and betterments; if putting in the timber increased the value of the bridge above the cost new, then the excess would be charged to additions and betterments. The fact that there may have been an increase in the present condition of the bridge, would not necessitate a charge to additions and betterments, but if it were something that increased the cost of reproduction of that bridge, or its value new, then you would make a charge to additions. If you substituted an entire new bridge for an old one, so much of the cost of the new one as equaled the cost of the old one, would be charged to operating expenses, and the excess to additions and betterments.

If in 1913 a wooden bridge which would cost to replace in kind \$10,000, were replaced with a plate girder on concrete abutments, at a cost of \$9,000, there would be no charge to additions and betterments, but would be a charge to operating expenses of \$9,000; there would be no deduction from additions and betterments by reason of the additional \$1,000.

Witness gives a statement of amounts expended by the road as op-

erating expenses for bridges, trestles and culverts:

													Michigan.	System.
1913											 		\$61,875.25	\$90,162.02
1912			 										11,300.00	14,815.90
1911			 . ,										12,481.01	15,913.17 21,153.59
1910				 									12,869.71	21,100.00

The amount charged to additions and betterments on account of bridges during the same years, was

1913			*										0										\$7	1	,2	38	5	Ď,	. ()(3	\$		*	71.	99	
1912																																		NO			
1911																		. ,			•												1	3'	74.	85	
1910																																•			54.		
July	1	1	8	10	17	te)	J	u	I	e	3	U,	1	9	L	3 .					4									•	Φ	00	,	, .	ou	

There may have been some credit which reduced the amount for the period 1907 to 1913, below that for 1913.

The rule stated would apply to the replacement of all struc-449

tures, but not equipment.

The expense of maintaining sidetracks and all items therein that would be charged to operating expenses would appear under general accounts, M. of W. & S. under sub-heads: superintendence, rails, other track materials, roadway and track, removal of snow, sand and ice, and bridges, trestles and culverts, if any. I have not been able to separate the costs or expenditures chargeable to freight on account of switches or sidetracks for any year.

In division of expenses to passenger and freight on revenue train mile basis, each revenue train mile, whether in passenger or freight service, carries with it an equal amount of expenditure on account of sidetracks and switches, except where they have been located to ore. That would be true of such track as spurs given under "branches," e. g. Fiborn Quarry or Danaher spur; the maintenance of all those tracks is included in the general maintenance account, and I have not separated any of that before applying the revenue train mileage basis.

Stationery and printing. Includes stationary supplies, printed

books, blank forms, rate sheets, tariff and division sheets and the cost

of their printing.

The rate division sheets are used to arrive at the division of rates, passenger and freight, between carriers. There would not be a great deal of work in fixing the proportions and making adjustment between companies after the division was once fixed; in making the divisions on these sheets there is monthly work in the accounting department; about 6 clerks, out of about 36 in the accounting department and a part of my time, is on that work. The amounts of the division

between carriers go onto our books. This involves a mutual 450 rendering and settlement of accounts and payment of balances; the money we collect for other companies in both the passenger and freight service in connection with what is due us, we distribute, showing the amount due other companies and render them a statement of that amount; they do likewise with us. is made in bulk as much as possible. E. g. the business on coupon tickets, Marquette to Detroit, in a single month, would all be divided in one transaction. The tickets are grouped together by months between various points. This is also true of freight way bills. involves an examination of each way bill and ticket for the purpose of grouping them; this is done by the station agents. They make monthly reports of the passenger business through their stations.

They make monthly freight reports. We get a tissue copy each day of the way bills, issued at our stations; we file them in a book by issuing stations, we revise the charges to see whether they are correct, make the necessary changes to make them conform with the tariff, notify the agents who issue them and the receiving agents of such changes, and file a bill to use at the end of the month in revising the abstract which would be sent at the end of the month.

On passenger business a few stations make daily reports. make a daily report showing the daily ticket sales and also the total earnings of freight forwarded, for the purpose of enabling us to make an estimate daily of the passenger and freight earnings; that

does not contain the details of the ticket sales.

Complt.'s Ex. 67, Delf, p. 12, general expenses; that includes for fiscal year 1913 \$23,690, as expenses of this litigation. It does not include anything for my time, that of Mr. Eldredge, or witnesses

who are also employees of the company.

That includes \$12,000 paid Mr. Fitch, former president 451 of the company, who was not in the active service of the company in this year; he was president many years up to 1911; the amount paid him in 1913, was the same amount as he had previously drawn as salary for a similar perior.

(Witness corrects previous testimony in which he stated the cost of taking out spur tracks was charged to operating expenses; he now says it is charged directly to profit and loss, referring to I. C. C. rule on this subject.)

Complt.'s Ex. 67, Delf, p. 15; iron ore to docks; average distance hauled 17.15 miles. This mileage is from each mine, to the dock at Marquette. The average distances of haul on other classes of freight on sheet 15, Complt.'s Ex. 67, do not take into account the distances travelled on sidetracks or spurs.

Complt.'s Ex. 67, Delf, p. 16; outside operations; the losses on dining car service for 1913, were \$11,606.49; the charges against that service are just those required by I. C. C. classification and include nothing for locomotive service or wear and tear of tracks or M. of W. & S. or anything of that kind, just for the operation of the dining cars exclusively. The sleeper service showed a net revenue of \$12,331.81, but includes no track or haulage expense or anything of that character.

Complt.'s Ex. 67, Delf, sheet 16; separately operated property loss, \$69,222.29; this is the loss on account of the Mackinaw Trans. Co.

We keep a record treating one passenger car over Mackinaw Trans. Co. ferry as equal to two freight cars, to make a further distribution of expense between ourselves and the Soo Line.

The Mackinaw Trans. Co. gets the revenue from passengers; this was, June 1912 to April 1913, \$44,060.50. The number of passengers could be approximated by multiplying this amount

by two, as 50¢ is the fare. For the 10 months, June 1912 to April 1913, the gross operating expenses were: \$107,920.62. The other earnings of the Mackinaw Trans. Co. were: mail \$1,-478.55, express \$2,231.63; baggage and miscellaneous \$785.10; freight \$2,386.79. The expenses given include taxes but not the cost of new boat or sinking fund. The income from freight is from freight moving locally between St. Ignace and Mackinaw City, and not passing over the railroads. Freight passing over the railroads

bears no additional charge for the use of the ferry in transfer.

Complt.'s Ex. 69, Delf, item superintendence under M. of W. & S. the Michigan proportion divided between passenger and freight on revenue train mile basis. That was done because it was deemed to be fair and equitable method of dividing it-because it was considered that the revenue train miles fairly measured the service given to the passenger and freight departments. A part of that expense was rendered necessary by wear and a part by weather.

Q. Now, what has the revenue train mile to do with the portion

of that expense that is caused by weather?

A. The revenue trains use the property that is deteriorated by weather.

Q. But the cars use them likewise?

A. They do.

Q. Why didn't you do it on the car mileage basis?

A. Because the trains are made up of the cars; the trains are a unit.

Q. Not of the same size?

A. No.

Q. Not of the same weight?

Q. And not of the same speed?

A. No.

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Q. And not of the same wearing effect as to weather conditions, in other words, the movement does not have anything to do with this weather expense?

A. The movement of the train does not control the

weather.

Q. Nor does it control the expense that is rendered necessary by the weather effect on these tracks?

A. No, the movement of trains does not control that.

Q. A proportion of the cost of these items was due to wear. Why, with respect to the part due to wear, did you divide on the revenue train mileage basis?

A. Because we considered that the train mileage basis fairly measured the portion of the expense assignable to the two classes of

business.

- Q. But your units of use in the two different classes of service were not on the same number of wheels, were they?
 - A. No.
 - Q. Nor of the same weight?

A. No.

Q. Nor of the same speed?

A. No.

Q. What test have you made to determine whether those units, the freight train mile on the one hand and the passenger train end on the other hand, would produce the same wear on track or the same effect in requiring expenses for maintenance of way and structures?

A. It has been impossible to make any such tests.

Q. A part of this superintendence embraced in this item was superintendence of repairs on sidetracks was it not?

A. Yes.

Q. And on branches on which no revenue train mileage is made?

A. Yes.

Q. And on the eight miles main line on which no passenger mileage is made?

A. Yes, about that.

Q. Will you tell me what the revenue passenger train mileage, has to do with the wear or with weather deterioration and the cost of repairs thereby, upon sidetracks, branches or

main line not used in the passenger business?

A. It is impossible to ascertain the amount of superintendence applicable to those tracks and it is considered that the revenue train mile fairly measured the maintenance of all the tracks as there are off-setting features, off-setting items and costs to the amount of expense which might be brought into that account or, owing to the cost of superintendence of those non-passenger tracks, brought about by the use of train mile basis. The off-setting features some of them being the greater speed of the passenger train on the main line tracks, the elevation of the tracks at curves the widening of the gauge at curves for the accommodation of the speed of the passenger train, the greater speed, the removal of snow and ice, freight trains waiting for passenger trains, company's freight carried in freight trains part of which is used in the passenger service. It is impossible to ascertain what proportion of these expenses should be charged to the passenger business.

Q. Do you know what weight you would attribute to any one of

those elements which you have spoken of, taken separately?

A. I could not express it in figures.

Q. You can only express it in an opinion?

A. In a general way.

Q. You cannot express it in a percentage?

Q. Do you know what influence or weight any two of them would have?

A. No.

Q. Or any combination of them?

Q. Without taking them all. Will you tell me how, if you cannot by any combination of them without all of them determine the weight or influence, you can tell what weight all of them should have. As a matter of fact you cannot tell it as any-455

thing but an approximation can you?

A. No, I cannot.

Q. In the passenger service where do you find any item of any other expense which is comparable with the element of this item of expense in the freight side of your expenses due to maintenance of sidetracks, of branch line and of main line, not used in the passenger business?

A. Comparable in class of service or in amount of cost.

Q. Either; state it to suit yourself?

A. In the amount of cost I should say that the items I have enumerated would approximately compare or balance with the cost

of maintenance.

Q. You must have in mind the items you have enumerated which make for greater cost on the freight side and there were other items which you enumerated which make for greater cost on the passenger side. Now, I am saying, take those you have put on the freight side, take from them the cost of maintaining exclusive freight track and you do not think what is left would balance. you do think that it is necessary to put in the exclusive freight track and its cost of maintenance to make the balance, is that correct?

A. I think by putting them in and making a division on the revenue train mile of all of the maintenance of way and expense that you do get a fair balance between the passenger and freight, including and off-setting those items of freight expense that should be

charged to passenger expense.

Q. Then you think it is necessary to put exclusively freight track and sidings in to weight the problems on the other side?

A. I think it does that.

Q. You think it is necessary?
A. If the cost of those items on both sides could be ascer-456 tained it would not be necessary.

Q. But they cannot be ascertained?

A. They cannot.

Q. But in applying your judgment you think the putting in of the exclusively freight property on the freight side must be put there in order to properly weight the problem-, to make them equal?

A. In the absence of any means of getting at it.

Q. Then the revenue train mileage basis in that interpretation would not be fair on a road which had no exclusive freight mileage would it?

A. In that case there should be some consideration given to those items of expense in the freight service that were properly chargeable to passenger?

Q. You know, do you not of this revenue train mileage basis being used on roads in keeping accounts where there was no exclusive freight mileage other than a few exclusive said tracks?

A. No, I do not.

Q. You don't know whether there was or not?

Q. Do you know whether the situation of the South Shore in the amount and value of the exclusive freight property is exceptional or not?

A. No, I do not.

Q. You don't know anything about that? A. No.

Q. You don't know and did not investigate that?

A. Why, I do know in a general way that other roads, a great many other roads, have a large amount of exclusive freight property.

Q. But you made no comparison to determine it?

A. No.

457 Q. And you made no comparison to determine if where the revenue train mileage had been used, conditions were comparable upon this particular item of expense?

A. No, I did not.

Q. Now, apply the revenue train mileage basis to practically every item under the maintenance of way and structures account, in your division between passenger and freight?

A. Yes, excepting docks and wharfs.

- Q. Can you point out any items under that account which does not exist in side tracks or in the branches used exclusively in freight, on the South Shore?
- A. Outside of the docks and wharfs I think they all relate more or less to such tracks.

Q. They would all include some part of the expenses?

A. Some portion of it, yes; a very little as to bridges, trestles and

culverts, possibly none.

- A. The cost of putting in switches and changing them comes under "Roadway and Track," and the material under "Other Track Material.'
- Q. In which of the items under the same general account would "Yard and station costs" come?

A. Maintenance of yard and stational costs? What do you refer

to by stational costs?

Q. I assume there are some stations where you haven't any yard trackage there. I am not talking about stational costs incidental to the operation and nothing else except those, that would be under maintenance of way and structures.

A. The rails put in a yard track would come under "Rails" the cost of putting them in would come under "Roadway and Track" repairs

of station buildings under "buildings, fixtures and grounds."

Q. There would be some of that nature of expense in practically every one of the accounts of this subdivision? 458

A. What nature of expense? Q. The yard and stational expense?

A. Any of these primary account items, if the work which they describe is done in the yard then there would be some of that expense in the accounts.

Q. And it is customary to do work of the character that would

follow under these items in yards is it not?

A. Whatever is necessary.

Q. With the exception of docks and wharfs, I assume?

A. Yes, I think that is probably all. It may be bridges, trestles and culverts; there may be a very little of that if any, there may be

under "culverts" perhaps.

Complt.'s Ex. 72, Delf: General account transportation expenses, item station employees; of these we were able to locate to passenger for 1913 \$10,746.06. That included compensation of employees selling tickets at stations and dealing with the passenger work at stations exclusively; the agent at Seney for example, would be allocated as common. We were able to allocate the station employees to passenger at St. Ignace, Marquette, Houghton, I believe at Ishpeming, and there might be others. I think we did not allocate to passenger any employees who did anything in the freight service; we endeavored to and I think did, confine it to the men doing exclusive passenger work.

The unallocated amount, under "station employees" was assigned between passenger and freight, on the revenue train mile basis. These men have a great many duties that are not connected with train movements e. g. making up various reports, reports of passenger and freight movements, monthly reports, taking in freight, and issu-

ing way bills, and the general duties of the station. Whether they do anything not connected with the movement of trains,

depends upon whether the operatio 1 of the road, is considered 459 to be directly in connection with the movement of trains, general It all enters into, or in some measure grows out of train movement as a result of their labor.

Complt.'s Ex. 72, Delf; transportation expenses, items beginning "yardmasters and their clerks"; that and a number of following items are allocated on the basis of 10% passenger and 90% freight.

Q. Did you make any tests since you gave your previous testimony

to verify that percentage?

A. I got some figures, but I have not summed them up.

Q. And you have not made any change in those on account of what investigation you have made - them?

A. No. Q. When you get that summed up we will be pleased to receive it,

if you wish to deliver it. The car accountant keeps a record of cars and their movements. Correcting this morning's testimony, his expenses would be under "transportation expenses, clerks and attendance." This is a considerable item. He gets a report every day from each train conductor, showing by number all the cars that train has handled, where taken on, and where dropped. He keeps a record of their movement and mileage.

For our cars on other lines he gets a report when a car goes off our line into another line, and a report from that other line if they de-

liver to still another, and so on, until the car gets home. For 460 foreign cars on our line we report by mail the disposition of their car when we do iver it to some other line. considerable number of our cars that would be off the line and a great many cars of other lines on the South Shore.

This making and receiving of reports involves a considerable amount of work; there is a car accountant and several entry clerks. That expense has been assigned between passenger and freight on the revenue train mileage basis; for the year 1913 with 67 of the cars passenger and 3,303 freight, I would say that the ratio of his attention to these cars would not be 48% and 52% or any percentage near that, but the ratio of allocation would be to cars, and it would be very much greater for freight cars.

Complt.'s Ex. 72, Delf; Shop expenses are spread over the items of expense under maintenance of equipment; the superintendence has been assigned between passenger and freight on the Michigan revenue locomotive miles; the number of locomotives on June 30, 1913, was 97, distributed: to passenger 32, Freight 52, and switch 13, rail use of locomotives would be shown by Complt.'s Ex. 81, Delf.

The freight cars are repaired in the use of this superintendence all over the line; probably over one-half of it is done in Marquette; correcting previous statement, the superintendence applies only in Mar-

quette shop.

Q. With Marquette shop used in repair and renewal of about 87 passenger cars and one-half of upwards of 3,000 cars, do you think locomotive mile basis fair for that division of superintendence?

A. The principal cost of that superintendence is in connection with the locomotives; a large amount of the freight car repairs—one half-is done out of the shops, and a large amount of that done in the shops being rough work, requires no superintendence; the superintendence is concentrated on the repairs of the locomotives or the

higher class passenger cars. I did not take into account the 461 fact that there were 30 times as many freight cars receiving repairs as passenger cars; they could repair 30 ore cars without a particle of superintendence, as against one locomotive, passenger car or sleeper, requiring close supervision, with a lot of superintendence.

(Stipulation: Objection to competency of Riggs to testify as to value of locomotives and rolling stock appraised in Complt.'s Ex. 1a. pp. 123 to 129, withdrawn. It is admitted that Mr. Anderson is qualified to and would, testify to the values there stated, and that said exhibit shall be treated in evidence with the same force and effect as though Anderson had appeared and testified to the correctness of the values for rolling stock and locomotives therein stated.)

We have no passenger trains running east of the Soo, Michigan;

all the passenger trains that terminate there are unloaded at the Soo; the joint Soo line and C. P. R. train, stands at our station and takes the passenger going further east. Our train arrives a little before the Soo line train, so the passengers use the station. I believe the C. P. R. has 4 trains per day into our station at Soo—2 each way. All of the passengers, except immigrants in through cars or colonists sleepers from the east over C. P. R., who go west on our line must unload and reload into our cars at Soo, and use our station for that purpose. We pay mileage on the colonists sleepers while they are on our line; we have an immigration station used by immigrants where they don't come in through cars, and have to make the transfer.

Complt.'s Ex. 81, Delf; does not show the switching of the road locomotives separate from the yard switching. It shows all switching mileage of each locomotive, regardless of the service it is in, and includes the switching made by the road locomotives at stations in excess of 1 hour, but not as a separate item. I can-

not tell what the road switching for road locomotives would be.

The increase in M. of W. & S. expenses in 1913 over 1912 was in considerable part in roadway and track and bridges and trestles. The increases in roadway and track expenses was: entire line \$19,-046.19; Michigan, \$22,631.55. If a switch were taken out and a different type put in in 1913 the expense, to the extent that the new replaced the old, up to the original cost of the old, or cost of replacing in kind, would appear in item roadway and track, unless the cost was more than \$200.

On additions and betterments unless the charge is \$200 or more, you make no charge to additions or betterments, e. g., assume it would cost \$300 to replace an old switch, and you put in a new one at a cost of \$400, the entire charge would be to operating expenses as the excess cost was only \$100; if the cost of the new switch was \$500, then \$200 would go to additions and betterments.

Assume a wooden pit cattle guard taken out and replaced by a new type and that the cost of the new type was \$50, the charge would be to

A part of the ballasting expense, including cost of application, putting in new ties and such costs as are incident to getting the ballast under the ties would be charged to roadway and track. The item ballast, includes all expenses incident to the purchase and production of ballast and delivering it to the point of use, and the labor of putting it in is under roadway and track.

The expenditures for grade crossings, fences, cattle guards and signs, increased in 1913 ever 1912 because there were more replaced; more maintenance in 1913 than 1912.

The item roadway, tools and supplies increased in 1913 over 1912 because more maintenance and more tools — used in performing the work. The item superintendence, increased materially in 1913 over 1912, due to the fact that more work was done in 1913 than 1912. The increases, under maintenance of equipment, steam locomotive repairs, passenger train car repairs and freight train car repairs, in 1913 over 1912, was due to the fact that there were more repairs.

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No part of the cost of labor of putting in the increased weight of rail \$18,601, in 1913, was charged to additions and betterments and no increased cost of handling and transportation on rail of this character over the lighter rail was included in additions and betterments.

The figures on page 14, of printed report for June 30, 1913, and similar figures in other reports, for additions and betterments are the actual costs of putting in the new structure; that does not mean the entire cost goes to additions and betterments; that it is the actual cost of the addition or betterment portion; it is not necessarily the actual cost of replacement.

"Q. In expense, Mr. Delf, what expenses occur directly in produc-

ing a train mile?

A. The wages of the train crew, fuel, water lubricants and other supplies for locomotives; the wear and tear of your track; all of the expenses under maintenance of way, equipment transportation, contribute to the cost of production of a train mile.

Q. The direct costs of producing the train movement and the train mile, leaving out the trackage cost, are those you first men-

tioned?

464 A. Well, the items under transportation expenses, dispatching trains, superintendence.

Q. And the fuel?

A. All the road expenses.

Q. Labor, water, lubricants and things of that character?

A. All the items to road enginemen, engine house expenses, road, fuel for road locomotives, water, lubricants, other supplies, road train-

men, train supplies and expenses.

Q. Those you have stated you have been able to directly allocate not the dispatching, but the fuel, the water and things of that char-

acter?

A. The road enginemen, fuel, the water and lubricants, being

assigned on the fuel basis on the basis of the fuel.

Q. The percentages that would be found by the amounts directly allocated to those particular expenses, should very closely approximate the percentage of the revenue train mile, should it not, if the revenue train mile is a proper basis for apportionment of other expenses?

A. No, I don't see that that follows. I don't see that they should. Q. Those are the direct expenses, the most direct expenses of pro-

ducing the train mile, are they not?

A. Yes.

Q. And if the most direct expenses of producing the revenue train mile, do not approximate the percentage reached on the revenue train mile, it rather indicates that the revenue train mile basis is not as good as some other, does it not?

A. No, I do not think it does. I would not agree to that.

Q. You think the revenue train mile perhaps gives more assurance of being correct than direct allocation?

A. I don't see what relation the expenses of fuel for road locomo-

tives, water for road locomotives, and those things, have to do with the repairing of fences or ditches or station buildings.

Q. I think you have stated that the revenue train mile does 465 not produce the deterioration there, it is produced by weather and the basis of the revenue train mile is an arbitrary basis for di-I am trying to get to the question of whether that arbitrary basis is proper, by indicating to you that where you have been able to assign directly the costs most nearly related to the production of that revenue train mile, they do not approximate the revenue train mile basis?

A. On your suggestion if we allocate the road enginemen and the road trainmen and arrive at a proportion of 40 passenger to 60 freight, other expenses that come under there are the yard expenses, and taking it, would divide the same way 40 to passenger and 60 to

freight; they come under the same head.

Q. The yard expenses you divide 10 to passenger and 90 to freight? A. My statement would follow if your suggestion, method of dividing them, was followed, if we took the percentage arrived at from things that we could allocate and applied that percentage to other

things.

Q. I am not suggesting that you follow that basis, but I am asking you if it is not a proper criticism of the arbitrary revenue train mileage basis, because those expenses which you can directly allocate and which directly produce the revenue train mileage basis, allocate themselves on a different basis and indicate a different percentage of cost in producing the revenue train mile of the different classes?

Mr. Eldredge: Do you say that, or ask the witness to agree to it? Mr. Wykes: I am asking him if it was not a proper criti-466 cism.

A. I don't think it would be proper to apply the ratio of fuel for locomotives, road enginemen, road trainmen to the interlockers. block and other signals, crossings, flagmen and gatemen, telegraph and telephone operations, stationery and printing of dispatching trains or superintendence, which are the only items under transportation expenses which are divided on Michigan revenue train miles.

Q. I haven't suggested that you divide on that basis?

A. You are asking me if it wouldn't be proper to divide these

other items on that basis.

Mr. Eldredge: No, he is asking you whether the fact that a different ratio is arrived at by actual allocation, does not indicate that the road mileage basis is wrong for those items of expense which you have divided?

A. The Michigan train mileage basis?

Mr. Eldredge: That you have allocated on a train mileage basis?

A. No, I don't think it indicates that.

Q. Those you were not able to allocate directly?

A. The items I have-Q. And you necessarily take an arbitrary basis?

A. Yes.

Q. You took an arbitrary basis which is composed of unequal elements which no one has been able to reconcile and which depends upon judgment, to say that they are equal. Now the point I put to you is that: considering the uncertainty of the correctness of that due to the fact that it cannot be determined, what weight should be

given to the unequal elements on the one side and the unequal elements on the other side; isn't it a criticism of that thing

that rests solely in judgment, that the expense which directly produces the revenue train mile, allocates itself in a different way than that judgment that you have applied to this arbitrary thing, would indicate?

A. I don't think it is any proper criticism.

The Master: Will you explain your reason why you don't think

A. Because I do not see that there is any relation between the two. Mr. Eldredge: Explain in detail what you mean; take up the items that you have divided that way and explain to Mr. Baker what you mean and the reason why you think the train mile does allocate properly?

A. Take the item superintendence.

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Mr. Eldredge: Just take under maintenance of way and structures and name the items that are divided on the train mileage basis if you want to understand him, I think if you would follow that thing and see what he has allocated on that-

The Master: He could take a single item and illustrate by that. A. Take the renewal of rails, renewal of ties, I cannot see that the wages of road enginemen in passenger service, road enginemen in the freight service, would bear any relation to the renewal of rails and ties.

The Master: Take another item?

A. The same of removal of snow, sand ice, that would be done by section men and by work train crews. I don't see that the relation between the passenger road enginemen wages and the freight road enginemen wages would be a proper basis to divide that between passenger and freight; the same way all through.

468 Q. Here you have got your tie in the track and part of this, the cause of its renewal and maintenance is weather, and part is wear, and you have to use some arbitrary basis to find out what goes to one service or to the other, and you say it is the revenue train mile because two different classes of trains pass over it, but those you admit are of unequal weight?

Mr. Eldredge: If you make it clear at all so that any one can follow you, confine it first to your weather.

Mr. Wykes: They both enter into it.

Mr. Eldredge: They both enter into it, but they enter into it in a different way; for instance, it would seem, to me that the revenue train mile basis absolutely allocated, so far as weather stress is concerned, whether the other did or not might depend upon a different state of facts

Q. Read the question to there please. (Question read.) are of unequal weight, they are of different number of wheels, they are of different amount of tractive force in the locomotive, they are of different speed, and you say that they are equal; now then, you take on the other hand, a force which produces the wear that is found in the consumption of coal, the force that draws the weight, the force that produces the wheel impacts, and we find that that force in the shape of coal allocates itself upon a different ratio; we find that repairs to the moving thing that produces the wear of track, allocate themselves on a different basis than the revenue train mile basis, isn't that a criticism in your judgment of the revenue train mile basis?

A. No, I don't think it is.

Q. Did you make any study of the number of curves on the South Shore, or the degree of elevation, or anything of that character, before you reached your judgment on this revenue 469 train mileage?

A. No, I didn't go into the number of curves or the degree of

elevation.

Q. Did you make any investigation of that in any way, that is to determine what degree of curve would be required by a passenger train moving at a certain speed or by a freight train moving at a certain speed?

A. No, I discussed those matters with our engineers though to

ascertain that they were facts.

Q. What facts aside from conclusion of equal wear or of greater wear by one service than another did you find; what facts?

A. As to the facts of the elevation and the facts of the widening of the guage at the curve.

Q. But you did not find anything about the degrees of elevation?

A. No.

Q. Or things of that character?

A. Not the engineering technicalities. Q. Did you make any study of train weights?

Q. Did you make any study of train speeds before you prepared the tables with regard to freight and passenger train speeds that you produced heretofore?

A. Except in a general way, to see what the general relation was between the freight and passenger train, which traveled the faster

on the average.

Q. Did you make any investigation of the different types of loco-

motives used in the different services?

I have tried to keep posted on that somewhat for a good A. Yes. many years.

Q. What are the types of locomotives used in the passenger service? 470

A. You mean by types, any particular name, or do you

wish the locomotives? Q. Well, no, I mean the types of locomotives that prevail in the freight service and in the passenger service. Now, assume that your passenger service is served by an American type locomotive, assume that is the prevailing type, just describe it?

A. Well, I cannot describe those locomotives by types.

Q. Do you know that the prevailing type of locomotives used in the South Shore passenger service is an eight wheel American type locomotive?

A. I don't know that I can state what it is by name of type.

The Master: Are there recognized types of locomotives?

Mr. Wykes: The different types I think have different number of wheels, different length of wheel base and things of that character.

The Master: Is there a classification according to type?

Mr. Wykes: As to the wheels.

The Master: Classification as to the wheels.

A. I cannot give you those classifications without referring to our records.

Q. What is the prevailing type used in the passenger service?

A. I don't know those locomotives by their types.

Q. What is the prevailing length of wheel base in the passenger service?

A. I cannot really testify in regard to those things, locomotives.

Q. Do you know that ordinarily the passenger locomotives have a rigid wheel base of about 8 feet and 6 inches, and the freight locomotives have a rigid wheel base of something like 15 feet and 6 inches?

471 A. The wheel base being from driver to driver?

Q. Yes. You don't know that?

A. I should judge that was about right from my knowledge of the engines.

Q. Did you make any study of the different degree of wear on

track on curves, due to the difference in wheel base?

A. Now, what information I have got I obtained from consultation with our engineers and trackmen.

Q. You didn't go into the detail of that?

A. No.

Q. You don't know what wear one of those locomotives would produce as against another?

A. No.

Q. And you don't know what wear a passenger coach would produce on the track as against a freight car?

A. No."

Official cars are principally hauled in regular passenger trains; both classes of trains carry the employees of the company from one point to another; in the superintendence of maintenance of way they travel a good deal on both classes, though on passenger trains where convenient; in inspecting track if a freight train comes along and they want to go to another place they take it; their movements would often be short, from where one gang of men were working to another.

The auditors and company officers travel usually in passenger trains; the persons carried on exchange passes are carried in passenger trains.

Complt.'s Ex. 67, Delf, p. 14: the average haul of intrastate passengers in Michigan of 32.48 miles is arrived at by dividing the passenger miles by the number of passengers; that took into

account the passengers from Marquette to the ball grounds, going out by special train of six or eight cars a couple of miles. On a passenger from Soo Jet. to Marquette, paying his fare on the train, depending on the train he was on, he might pay to Soo Junction and Soo Junction to Marquette, and we would get him as two passengers on this computation. A passenger St. Ignace to Marquette, on certain trains would pay to Soo Jet. and then pay again from Soo Jet., and we would get him in as two passengers. There are other points through Marquette, e. g., where if a man traveled on a local on the line there would be a change, of conductors and two cash fares taken.

The man in each instance, including those Soo to Marquette and St. Ignace to Marquette, takes another train every time. Assuming he came through Marquette on No. 1 or 2, he would come through without changing trains or cars; if he paid a cash fare coming into Marquette that conductor would take him to that point, and you might get the man again for two fares on one trip. As Nestoria from the west coming east, the same thing would not occur.

"The Master: Then this haul on this would not be accurate

would it?

A. It is in accordance with the way you have to make your statistics and reports.

The Master: Where you change trains you call that another haul,

where you change trains?

A. If a man pays his fare you cannot keep track of that man.

The Master: If he did not change trains it would be one haul although you get two fares?

Mr. Eldredge: From our standpoint. How could we know that there was a distinction between them?

The Master: I was looking at it as a question of fact."

On an interline ticket, the accounting required would be:
the ticket contains a printed form coupon, showing the roads
over which issued, and upon which the agent writes the destination,
unless it is printed, and the amount for which sold; this coupon he
retains; at the end of the month he reports all such tickets, grouping
all tickets from his station to the same destinations by the same
routes, together, sends that report to my office and reports the total
revenue collected on the various tickets, and we check it to see that
it is correct, and apportion the revenue among the lines interested
in the travel; in an extreme case there might be 8 or 10 coupons;
reports are made by each company of the amount coming to it from
the others and the balance paid by draft. Each company is settled
with separately.

On a card ticket the process is: each night the agent goes through

his card case to see what card tickets are sold, makes a summary and records them in his books. At the end of the month he makes a report to my office of the card tickets to each destination, showing the commencing number to each station at the beginning of the month, and the closing number at the end of the month. amounts are extended showing the numbers sold and amount collected on tickets sold to each station from his station; in my office, the report is checked with the individual tickets and recorded in the books.

His report of coupons or interline tickets are checked with the stubs, he makes a daily computation of amounts and makes a daily report from which we get our estimate of the daily earnings. the interline tickets the general passenger agent of our road would attend to the printing, get up the proofs, and pay the cost. one of those long form tickets takes longer than to sell a car ticket; coupon tickets are often made so that he has to write

the name of each station to which sold on each coupon, and stamp each coupon. He must detach the stub and enter the destination on it. We have a standard form for interline tickets in connection with each road and each company gets up its own form.

There probably would be more inquiry in connection with a long trip ticket than with a local ticket, and I presume more inquiry of the conductor about connections and things of that kind. He would not be informed of connections beyond our line, but if he is asked he can take his book and give them the information. I presume many people going on a journey of that kind ask for time tables. The cost of printing the interline tickets is considerably greater

per ticket than the cost of card ticket.

If you should go to any of our ticket agents and tell him you were going to use our line to New York, he would wire for Pullman reservations at the company expenses. It takes the time of the station man to send the message, and to get and communicate the answer. He would do the same thing on a ticket to Detroit or Bay City. We sell considerable mileage; the mileage pulled generally indicates the distance traveled on the trip.

A passenger to Chicago from Marquette, for example, on No. 11, unless in the sleeper would have to use the station and change cars at Negaunee. Passengers from the western division to Chicago on some trains would be required to use the station facilities at Ishpem-

ing or Negaunee.

If in a certain year the intrastate passenger mileage increased 5%, and if our station forces, conductors and train service were there to force working up to their limit, we would have to increase them. If

they were not working up to the limit the additional cost would be very small. The same would be true of a 10% in-475 crease, if the trains were not up to their limit. carry more passengers in each class, intra and inter state now, without perceptibly increasing our expenses. Take the line as a whole we could increase. If our passenger business should increase 20%, it would not increase the expenses very much, not nearly 20%. It would require the printing of extra tickets, would perhaps affect the number of the train crew and we might have to run more trains, and increase station forces, and the auditing department somewhat.

DELF.

Redirect:

At the end of the day's work, the ticket agent must examine not only the compartments from which he has sold card tickets but for the preparation of his report also examine compartments from which he sold no tickets. He has to go through all of them to know whether the closing number is the same as the commencing number in the

A passenger paying his fare to Marquette, and renewing his journey out with a different conductor and again paying his fare,

could check no baggage.

All coupon tickets are not interstate; over 75% of them are intra-Intrastate coupon tickets result from the fact that we sell tickets on points on other lines in Michigan. The expense of handling those tickets is the same as that of handling an interstate ticket, except as the expense of handling the latter may be increased by the number of coupons. The selling and accounting expense of handling a coupon ticket is in excess of that of handling a card ticket. The difference is not great. The principal feature would be the time of the ticket agent in selling the ticket. And this would be greatly offset on the other hand by the difference of time in get-

ting his record on the local ticket as compared with the 476 coupon ticket which is right before him. In places where all the tickets were sold by one agent, this would increase the work without increasing the expense. In the accounting department, in my judgment, the expense is about the same in each class of ticket.

In taking into consideration the volume of the passenger business, this account and stational expense of handling a ticket is not great, that is the expense of selling and accounting per ticket. The greater part of the passenger stational service is occasioned by selling and account- for tickets and checking baggage.

The Master: Can you form any idea of the percentage of additional cost or work that is involved in selling the coupon tickets as

against the selling of the card tickets?

A. That is a pretty difficult thing to estimate. I do not know that I could venture a statement on that.'

DELF.

Recross:

The ticket agent at a station of importance has the card tickets all in a case behind him where the face of each local ticket is exposed; I stated that this time in checking the sales out of that rack for the day was considerable.

"Q. He does it in ten or fifteen minutes doesn't he, or less?

A. I couldn't state the time."

If he has done a considerable amount of local ticket selling, he could not do it in 10 or 15 minutes, because if his sales had been varied, he must take down the closing numbers of his tickets, subtract them and extend the amounts and get at the total of his sales on card tickets to each destination. With coupon tickets he would have his stubs before him, and would total them up for the day. On the card tickets he must find out what number of ticket he starts in with in the morning, and what number he left off with at night.

"Q. Where he has made no sales he knows from the pencil line

previously drawn down across the ticket, does he not?

A. No, he pays no attention to that ticket. He has to look at

them to see if the pencil mark is on there."

I have produced printed annual reports to stockholders for the system, without division to Michigan by fiscal years for 1905 to 1913 inclusive. (These marked defendants' Exs. 43a to 43h, 1911 and 1912 previously marked Complt.'s Ex. 39 and 40, offered in evidence and 1905 to 1909 inclusive objected to as irrelevant and immaterial.)

Defts.' Ex. 43h, Delf, p. 6; printed annual report for 1913. The item "property investment," road \$43,946,516, represents all charges into that account less credits, which have been made to the account since the beginning of the operation of the D. S. S. & A. I am not able to say how much of it represents invested money, as a large portion of it is stock and bonds that were issued in payment of completed road. I do not know on what basis the completed road was taken over for the bonds; I know the bonds and stock that were turned over, but do not know on what basis.

I do not know the relation which the amount allowed for the purchased property, bore to the actual cash cost of building the property that was sold; we have no knowledge of what the property actually cost, that is, that property that was acquired in exchange for the stocks and bonds. That was the consolidated roads in 1887;

\$22,000,000 of stock and \$4,000,000 of bonds were given 478 for a certain number of miles of completed road. haven't the number of miles of road, something over 300, about 330 miles I think it was, of completed road. This, I think, include all the present main line, St. Ignace to Marquette; part Soo to Soo Jet.,-none to Marquette to Houghton; all Nestoria to Iron River, Wisconsin. It did not include Marquette and Western which was a part of the M. H. & O.; the total of \$43,000,000 does include that; it also includes M. H. & O. lands now owned and those sold by South Shore Land Co.; there have been no credits to the account as lands have been sold. I have been South Shore Auditor since 1894. I do not believe there were credits to that account before 1894 for abandoned property, and things of that character. make no credit for property, e. g., ore docks, cars or freight cars, The item, same page of printed report, equipment \$4,-214,690, has been accruing since the beginning of the road; I do not know whether it represents actual cash investment, before I came in as Auditor; there were no credits made for equipment worn out or abandoned until 1907.

I do not know how fully the bonds of the previously existing com-

panies were recognized in the consolidation in 1887 and taken care of by the allowance of new stock or bonds; I do not know that for any of the companies entering into that consolidation. I have no knowledge so that I can explain the increase in reported cost of road between 1886 and 1888. The D. M. & M. report to the Railroad Commission for 1886, shows a cost of property of \$3,011,205 for 150.8 miles, which would be \$20,000 a mile in round numbers; the D. S. S. & A. report for that property for the next year and reported by the Railroad Commissioner in 1888 shows cost of road increased to \$26,000,000, the mileage increasing to 197, thus increasing the cost per mile from \$20,000 to \$134,000.

I have no knowledge or information whether, in the con-479 solidation of 1886 or 1887, after the foreclosure of the D. M. & M, mortgage, its common stockholders received 60% of their pre-

vious holdings in the stock of the consolidated company.

I do not know whether on this reorganization the land grant bonds retained their security and in addition received 35% of their holdings in stock; nor do I know whether the first mortgage bond holders of the D. M. & M. received new bonds of the consolidated company, and a considerable bonus in preferred stock. Our books give no information in regard to any such transaction.

Where we put in a new structure, the amount charged additions and betterments does not show the expenditure for time of general officers, the engineer, the accountant, the supervision, the cost of transporting material, or things of that character. In case an engineer went and laid out the ground his time actually put on there would be distributed to that cost but general supervision and general

officers would not be. The amount of replacements in 1913 was considerably in excess of other years including 1912; that is one of the reasons that contributes to making the operating expenditures for maintenance of way and structures items, larger in 1913 than in 1912. There were more replacements and more additions and betterments in 1913 than 1912; there is apparently a little increase in 1912 over 1911. gaunee depot was built in 1911 and the Marquette car shops in 1912. Both that station and the car shops were exceptional structures.

In compiling information for annual reports we endeavored to state the real facts; it is reasonably accurate, and the variation, if any is simply an error or oversight; there are also some clerical errors

which correct themselves from an inspection of the of the We use and rely upon those reports as accurate for 480 the purpose of our business.

I believe the operating ratio in Wisconsin for 1913 was above 100%;

DELF.

Recross:

(Witness produced statement of expenditures for additions and betterments, 1900 to 1912 marked Defts.' Ex. 46, Delf, and introduced in evidence.)

The expenditures on account of road shown are the net expenditures charged to additions and betterments for road.

The totals in Defts.' Ex. 46, Delf, should check with the totals of

the printed annual report to the stockholders.

Duluth, South Shore & Atlantic Railway Co.

Train Mileage on Republic Branch, Fiscal Years Ended June 30th, 1910, 1911, 1912 & 1913.

	1910.	1911.	1912.	1913.	Total.
D. S. S. & A. Pass. trains	51	34	68	85	238
C. M. & St. P. " "	2,199	2,191	2.191	2,191	8.772
D. S. S. & A. Freight "	1,220	1,866	1.608	1,916	6,610
" Ore "	7,963	6,047	2,926	4,862	21,798
" (Special, Circus)			34	• • • •	34
	11,433	10,138	6,827	9,054	37,452

The C. M. & St. P. mileage stated, is that of the passenger trains Milwaukee Jct. to Marquette. This mileage is not included in the revenue passenger train mileage, shown in my exhibits. The small amount of D. S. S. & A. passenger train mileage, is excursions or similar trains.

Between July 1, 1911 and June 30, 1912, fourteen 80 pound split switches replaced twelve 60 pound split switches, and one 70 pqund split switch, replaced one 72 pound split switch. Between July 1, 1912, and June 30, 1913, one 80 pound switch

replaced one 60 pound split switch.

Between July 1, 1911 and June 30, 1913, 74 old style cattle guards were replaced with new steel cattle guards and 18 new steel cattle guards were put in that were not replacements. The total 92 were all charged to operating expenses.

The entire cost of replacing switches was charged to operating expenses; the 80 pound switches, split, cost \$40.80, the 60 pound \$32.87; and the 70 pound \$34.39. This did not include labor.

The entire cost of the new reenforcing stringers on bridges was charged to operating expenses; that is so in all cases where the stringers were put on the bridges to strengthen; I do not know as that is true where the bridges were rebuilt.

DELF.

Redirect:

(Complt.'s Ex. 84, Delf, shows the mileage of certain locomotives, which ran in both freight and passenger services, by months for the year ended June 30, 1913, together with the percent of each in each service for the year.)

Complt.'s Ex. 83, Delf, shows the mileage of each engine for each of the years 1910 to 1913 inclusive, and the percent it ran in each service.

The term "other" under "kind of service" on Complt.'s Ex. 84, Delf, is yard switching or work service, and does not include road switching.

DELF.

Recross:

The locomotives treated on Complt.'s Ex. 84, Delf, are only those which make less than 95% of their mileage in the service to which principally devoted. In making this table the road switching goes into the freight mileage. It is added as switching mileage.

482 In distributing our coal it is.

The switching mileage other than the yard switching, appears as freight mileage in making the distribution of fuel. (Note: Nothing appears in switching mileage for the first hour's work at any station, and nothing appears if the locomotive worked less than an hour at any station.) On Complt.'s Ex. 67, Delf, the freight locomotive mileage does not include road switching mileage; in distributing coal the road switching mileage on p. 4, Complt.'s Ex. 67, Delf, is used to distribute coal to the freight service in Complt.'s Ex. 83, Delf. In locomotive repairs the road switching mileage goes in, to make an assignment to freight.

DELF.

Direct:

The amount of stores and supplies as shown by the annual inventory was 1910 \$264,256.74; 1911, \$246,908.23; 1912, \$340,057.74, 1913, \$362,503.16. Those figures are corrected somewhat from figures I furnished Mr. Riggs. We have eliminated some rail loaned to other parties. These figures are as of June 30, each year.

(Witness produces statement showing statistics for Mackinaw Trans. Co. as follows:)

483

portation Co. and Payments Made by D., S. S. & A. Ry.	
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Statement of Earnings and Expenses of Mackinac Tran	

\$7,297.87		•	Special payments made by D. S. S. & A. Ry. Co. on new boats
\$10,833.33	\$10,000.00	\$10,8:3.33	Payments made by D. S. & A. Ry. Co. toward Boat replacement fund
\$11,899	\$9.332.17	\$16,380.28	D. S. S. & A. proportion of net expenses
\$48,048.87	\$46,658.76	\$58,746.82	Earnings in excess of carnings
\$102,175.45	\$96,323.17	\$102,443.89	Operating Exps. & Taxes
\$54,126.58	\$49,664.41	\$43,667.07	Total earnings
4,942.03	2,852.87	2,039.78	Freight & Miscl
3,472.77	3,304.25	3,378.52	Mail & Express
\$45,711.76	\$43,506.69	\$38,278,77	Passenger
			Mack. Trans. Co. Gross Earnings:
1912	1911.	1910.	In D., S. S. & A. Acets. for
May 1, 1911, to May 31, 1912.	May 1, 1910, to Apr. 30, 1911.	June 1, 1909, to Apr. 30, 1910.	Mack. Trans. Co. Aects. for
	* ± * * *		\$38,275.77 \$43,506.69 \$3,378.52 2,039.78 \$304.25 \$43,697.07 \$49,664.41 \$\$50,443.89 \$96,323.17 \$\$10,873.33 \$10,000.00 \$\$

The special payments by South Shore on new boats in years ending May 31, 1912, and April 30, 1913, were in addition to the regular monthly contribution to the boat replacement funds, accumulated since June 1, 1903. The Mackinaw Trans. Co. in 1888 purchased the steamer St. Ignace which was retired from service March 1913. They purchased the steamer Ste. Marie in 1893, she was in service until June 1912. Since June 1906, the three owning companies had each contributed \$10,000 a year to furnish a fund for the purchase

of new boats. The Wawatan, put in service Oct. 1911, cost \$389,853; the boat replacement fund which had been accumulated, was applied in payment; it was necessary for the owning companies to make additional payments and in the fiscal year 1912 \$7,297.87 was paid by the South Shore on the Wawatan. Previous to 1910 the South Shore had paid into the boat replacement fund \$30,000. The balance of the cost of the Wawatan was provided for by bonds for \$184,000.

The new steamer, Sainte Marie, was put in service March 1913, and cost \$278,660. The South Shore, June 1, 1912 to April 30, 1913, contributed cash on account of that steamer \$40,078.13, and an equal amount was contributed by the other companies; the balance of the South Shore and G. R. & I. proportions was obtained on notes.

The number of freight and passenger cars handled by Mackinaw Trans. Co. the passenger cars including baggage, express, diner, sleeper, etc., cars, was:

	Freight cars.	Passenger cars.
1910	 . 46,299	4,919
	 400	5,304
	 40 450	6,398
1913	 46,092	6,045

For number of passengers I have no figures except for year ended June 30, 1911; that would not take in local passengers, paying their way across and not traveling on through tickets. There was: total 67,254 passengers transferred in connection with business interchanged with D. S. S. & A. of which 53,017 or 78.8% were intrastate, and 14,237 or 21.2% were interstate.

DELF.

Recross:

The earnings shown are the totals received by the Mackinaw Trans. Co. for transportation of all passengers across the straits, including local passengers not travelling on through tickets. The operating expenses and taxes shown are those for the entire ferry.

The amount stated as passenger, mail freight and miscellaneous earnings on the statement were used to reduce the operating expenses to get at the net; they were not used to arrive at the division. The net expenses of the Mackinaw Trans. Co. are borne by the three companies in proportion with the earnings of each of the companies on

freight business that is transported across the Straits for them bears

to the total of such earnings.

The basis of the division takes into account the revenue for the entire haul on that business which is carried to the ferry by either one of the three railroads, and the South Shore proportion of the net expense is that which is again reduced by charging off some part of that to the Soo Line. The items which are stated opposite the D. S. S. & A. proportion of net expense, is that left after the Soo Line proportion has been taken out. The Soo Line proportion does not enter into the D. S. S. & A. expense at all.

DELF.

Redirect:

The business on Dead River Branch, July 1, 1909, to June 30, 1913, was:

	Loaded freight cars.		cht cars.	Passenger cars in
	In.	Out.	Total.	and out (each).
1910	322	206	528	133
1911	76	213	289	188
1912		25	56	105
1913	189	121	310	144
Total	618	565	1,183	570

The loaded freight car mileage would be 2,957; assuming an empty car mile for every loaded car mile; it would be 5,914; the passenger car haul from switch to fair grounds is 1.5 miles and passenger car miles would be 1710.

DELF.

Recross:

The total distance from Marquette depot to fair grounds is 2.8 miles. There is no record kept of locomotive miles on this branch;

the mileage made there is included in the switching miles.

If you were about to ballast the mine tracks, it is likely the ballast would come from the mines. The ties for use in the mine tracks would be bought out on the line, and from the point of purchase would move to the mine tracks over the common track; the same thing would be true of the rail; they would be moved from the place of storage or from the place of being taken out of other track to the point of use over the common track, and would involve the use of common cars and common locomotives.

The timber for repairing the ore dock might come from west of Duluth, and use the common track from the State Line to the ore dock, or that timber or some of the material might come in from the Soo, and use the common track Soo to Marquette; all structural material for the mine track that was shipped in would be moved over the common tracks; there has been no account kept of the number of tons

of material for use in repairing or constructing the mine tracks and moving over the common tracks. The material used in a freight spur from the point it came into the line or at which it was on the line, would use the common track in moving to the point of use.

The revenue accruing to Mackinaw Trans. Co. from passengers delivered to it, ticketed from points on South Shore and Mineral Range for fiscal years, being the amount collected for coupons of the Mackinaw Transportation Co., was 1910, \$15,392.99; 1911, \$15,565.06;

1912, \$13,154.97; 1913, \$18,658.45. This is 50¢ for each coupon or 25¢ for each half fare. I should think the local 487 passenger business on the ferry would be small in comparison.

(DELF.)

Redirect examination:

I have made statements, Deft.s' Exs. 47 and 48, Delf, for the years 1911 and 1913 of the outside agency expenditures; This shows divis-

ion between freight and passenger, and inter and intrastate.

The common passenger proportion is divided intra and interstate on the equated passenger mile basis, being in 1911 intra 63.42%, and inter 36.58%; the percentages upon the flat mileage basis, without equation, would be for 1911, intra 60.12%, inter 39.88%. This inequation, would be for 1911, intra 60.12%, inter 39.88%. creases the intra passenger miles 15%; in arriving at the percentage; I think the same reasons apply to an item of this kind as to those having to do with the actual carriage of passengers; these expenses are incurred in securing the passengers and in doing the passenger busi-The only common item is the expenses of the Grand Rapids office; the specific reason for adding 15% is that the intrastate passengers produced through the outside agency expenditure get greater service per mile than the interstate passengers. The reason for weighing the intrastate passenger mile is the same in all instances. where it is used; that is that it would cost more.

The real reason why I divide outside agencies on an equated mileage basis was because I applied that basis to the other expenses; I did not give definite consideration to the weigh- of this particular

item by itself.

For 1913 the common items of passenger are divided to intrastate, 68.66%, and to interstate, 31.34%, on the equated passenger mileage; the straight mileage basis would have been intra-

state 65.58%, and interstate 34.42%. 488

DELF.

Direct:

Referring to Defts.' Ex. 47, Delf, the items, common passenger on account of Grand Rapids office, divided between inter and intra on equated passenger mile basis, I think a more equitable division is on the basis of the business from the territory covered by the passengers solicited. The total number of passengers received from G. R. & I., M. C., P. M., D. & M., and G. T. for fiscal year 1913 was 25,583, of whom 23,295 or 91% were intrastate; I believe a proper division of that item would be 91% to intrastate rather than the

equated passenger mile basis.

I would not say this was an allocation as the man whose expenses are thus assigned would possibly have nothing to do with those tickets, but he covered the territory in which those tickets were sold, and I think the relation of inter and intra tickets would be fairly measured by the relations of the total business out of the territory covered. The greater proportion of the business we get in this territory we would get without a solicitor; the great majority of the people who buy tickets routed over our line, do not know we have a solicitor in Grand Rapids, he does not deal directly with them, but with the agents of the lines selling those tickets; he makes periodical visits to them and dendeavors to have them sell their business over the D. S. S. & A.

There is absolutely no way of telling what business the outside agency soliciting man produces; he does not sell any business and it is only so far as his influence with agents of other lines goes what

he is of use to the company.

I believe the more accurate way to divide the common passenger expenses, of the Marquette and Houghton travelling freight and passenger agents, between inter and intra would be on the relation of the inter and intra business represented by tickets sold at South Shore stations in Michigan; of these 1913, 94% were intrastate.

I have taken the number of tickets sold without regard to the length of movement and have included tickets between local points where there is a good deal of business that no other line could get, as well as tickets for interchange business. The travelling ticket agent in Upper Peninsula, I believe visits all stations, and his business is usually with the agent; in many instances with the head of a society arranging for a local excursion, base ball teams, etc.

Complt.'s Ex. 85, Delf, shows for years 1911, 1912 and 1913, ticket sales of various classes on South Shore. This is similar to Complt.'s Ex. 64, McPherson, with minor corrections, and variation as to mileage exchange tickets; the 1911 figures take no account of

mileage books, though they were then used.

Assuming that between 1911 and 1913 the number of interstate tickets remained constant, but the intrastate tickets increased 30%, it might, and probably would, have been necessary at the points where the greatest part of the increase occurred, to have increased facilities for selling tickets. I do not know as such facilities were increased between 1911 and 1913; there has been demand right along at the stations for increased help, and in many instances they were made; I do not mean to say that that was altogether due to increase in passenger business. It was an increase in all the business at the station, partly passenger and partly other kinds, and it may have been due to increase in passenger at some point. At the smaller stations I presume the agent can sell 30% more tickets without the station of the presume the agent can sell 30% more tickets without the station of the presume the agent can sell 30% more tickets without the station of the presume the agent can sell 30% more tickets without the station of the presume the agent can sell 30% more tickets without the station of the presume the agent can sell 30% more tickets without the presume the agent can sell 30% more tickets without the presume the agent can sell 30% more tickets without the presume the agent can sell 30% more tickets without the presume the agent can sell 30% more tickets without the presume the agent can sell 30% more tickets with the presume the agent can sell 30% more tickets with the presume the agent can sell 30% more tickets with the presume the agent can sell 30% more tickets with the presume the agent can sell 30% more tickets with the presume the agent can sell 30% more tickets with the presume the agent can sell 30% more tickets with the presume the agent can sell 30% more tickets with the presume the agent can sell 30% more tickets with the presume the agent can sell 30% more tickets with the presume the agent can sell 30% more tickets with the presume the agent can sell 30% more tickets with the presume the agent can sell 30%

out overtaxing him; not knowing the number of tickets withat each station I could not say at what station he could not do so; I think some additional help was given the ticket agent at the

Marquette station.

There were no changes made at any other stations in the ticket The principal number of tickets are sold within half an hour of leaving time. I do not know of any increase in our conductors between 1911 and 1913.

Complt.'s Ex. 86, Delf; a statement showing cost of repairs on each locomotive for each of the years 1910, 1911, 1912 and 1913.

At present there are 196 points on South Shore in Michigan, where freight may originate or be delivered; during fiscal year 1913 there were 200; there are 42 stations on the road in Michigan where there is an agent for the purpose of receiving or delivering freight, doing the billing, collecting charges, and other freight work.

DELF.

Recross:

Our passenger trains do not stop at all those 196 or 200 points; they stop at the 42 agency points and at many stations where there are no agents. There may be a few more passenger ticket agencies. There are not sidings at all these 196 or 200 points.

When we discontinue the freight service at a particular station if there is no more business to be had there, the siding would be taken up; in every year some of the points go out and new points come in. The reason for strengthening our bridges, principally is on ac-

count of the increased weight of our motive power-the new engines. I am of the opinion that the bridges east of Soo 491 Junction, and the Carp River bridge, will complete the re-

pairs necessary to carry our new equipment.

On account of each of the replaced bridges, there should have been a charge to operating expenses of an amount equivalent to the cost of reproducing the old structure in kind at the time the new structure was put in.

DELF.

Redirect:

The strengthening timbers on bridges were charged to operating expenses. I believe under a strict interpretation of the additions and betterments account they should be charged to additions and betterments, rather than to operating expenses. The charge was made in the engineering department, and there was a difference of opinion in the interpretation of some of the classifications. difference of opinion did not arise until after this question came up I believe under the classification the additional strengthening timbers should have been charged to additions and betterments, though it did not bring the structure back to its new condition or value.

Where additional material is put into a bridge to permit it to

carry heavier tonnage, it should be charged to additions and betterments.

Complt.'s Ex. 87 is a statement showing the stational service given at points of origin to less than car load freight originating in Michigan on the D. S. S. & A. Ry. and at destination to less than car load freight delivered to consignees at points in Michigan on the D. S. S. & A. Ry. for the year 1913, separated as between intrastate and interstate.

DELF.

Recross:

Complt.'s Ex. 87 has reference only to service given at point of origin or at point of delivery to consignees on D. S. S. & A. 491a It has no reference to service given to a shipment received from or being delivered to another line at a junction point. I have not taken account of the latter service in this statement. The exhibit has no reference to the service through the injunctions, such as at the Soo, St. Ignace, Munising, Shingleton, Ishpeming and Negaunee, and other junction points.

(Defts.' Exhibits 49 and 50, Delf, outside agencies expenses for 1910 and 1912, introduced in evidence. The method of preparation is the same as that applied to the years 1911 and 1913, Defts.' Exhibits 47 and 48, Delf.)

On April 20, 1914.

DELF, recalled.

Further cross-examination.

By Mr. Wykes:

As auditor for the South Shore, I make reports for the Soo Union Depot Co. which was organized in 1900 and made its first report to the State Board of Assessors in 1908. The total cost of property to June 30, 1908, is given in the 1908 report, at \$114,-397.16. That includes real estate, structures, and \$500 worth of equipment. The right of way and station grounds cost is stated separately. It is given at \$38,431.67, exclusive of buildings. The right of way and station grounds were purchased in 1900 or before, the depot being built in 1900. The cost of the station buildings and fixtures is given at \$45,099.23, that was principally the Union Depot. Some appurtenant buildings have been put in since.

The 1913 report shows the cost of property to that date to be \$118,634.85; the cost of right of way and station grounds is carried in the latter report at the same figure, \$38,431. The report shows that there were no expenditures for real estate or right of way or station ground between July 1, 1907, and June 30, 1913. The total capital stock paid in of the Depot Co. is \$75,000. There are no

bonds. The assessment of the company is \$100,000.

On June 26, 1914.

Delf, recalled.

Further cross-examination.

By Mr. Wykes:

In Ex. 108 in Ore Rate Case (Defts,' Ex. 76 here) I attributed 25.75 miles of the D. S. S. & A. trackage to its exclusive ore business; 8.73 miles of this was treated as main line, and 17.02 miles as branches; the main line is the south or second line Winthrop Junction to Eagle Mills, part of which was formerly used in passenger business; it is not a continuous line, as there is a break in the westerly portion of Negaunee where the Queen mine caved under it; the part that cannot be operated through is a mile and a half or two miles. In Ore Rate Cases I assumed an average maintenance of \$500 a mile for exclusive ore trackage covering items of expense under the maintenance of way and structures group. I

assumed those expenses covered all that pertained to the ore business; there might be other expenses of those tracks, but we assigned no others to the ore business; we treated those track expenses as the equivalent of \$500 a mile. For the entire trackage of the Houghton division I found an actual expenditure for the same items of \$913,91 per mile.

Defts,' Ex. 75 and 76, Delf, are Exs. 106 and 108 in the Ore Rate

Case respectively.

The D. S. S. & A. receives no part of any sleeping or dining car revenue derived from the sleeping or dining cars of other companies. From the C. & N. W. and C. M. & St. P. we get revenue for permission to them to run their trains over our tracks.

On July 21, 1914.

DELF, recalled.

Further direct examination.

By Mr. Cotton:

Mr. Thompson's division of the item expenses of station employees is not proper. He accepted our allocation between passenger and freight and divided the common expenses for station employees upon the relation that the allocated items bore to each other. It is only possible to make allocation at a few points and at certain points the total expense of station employees was for freight; the amounts allocated to passenger were small. The relation of the passenger and freight business at the stations which are common is not at all the same as it is at the stations where we were able to allocate portions. The time method does not charge enough of the common item to passenger. I believe the revenue train mile basis fairly divided the common expenses and is more nearly correct than the method used by Thompson.

Number of trains per

I think the statement of Mr. Thompson, that, considering the equivalent of complainant's entire line in Michigan, there would be a use of such line daily by about 3.6 passenger trains and by about

8.85 freight trains, is incorrect.

494 I have made a computation for each fiscal year, 1910, 1911, 1912 and 1913, and for the aggregate of those years, for both freight and passenger trains. I believe it is correct. It is as follows:

Duluth, South Shore & Atlantic Railway Co.

day over equivalent to the entire line in Mich. on which Fiscal. train miles are proyear. ducea. 1910.... .Pass. $750,263 \div$ 152,931 ==4.905 Frt. $909,983 \div$ 152,931 =5.945 .. Pass. 765,460 ---152.931 =5,005 Frt. $819.900 \div$ 152,931 =5.361 .. Pass. $733.828 \div$ 152.931 =4.789 Frt. 801.359 -152,931 =5.240 1913. Pass. $766.394 \div$ 152,931 =5.011 Frt. $865,096 \div$ 152.931 =5.657 4 years, 1910-1913 Pass, 3,015,945 ÷ 6,111,725 == 4.932 Frt. $3,395,338 \div 6,111,725 =$ 5,550

The mileage of one train each day over track on which passenger mileage produced, for one year of 365 days, would be 152,931 miles. Dividing the freight train miles by that figure would give 5.945 freight trains in 1910, and dividing the passenger train miles by that figure would - 4.905 passenger trains in 1910, that run over the equivalent of the entire line in Michigan, on which train miles pro-The table shows like computations for the other years and duced.

for the total of four years, and results. The time ratio 4, of 495 Thompson, I don't think proper, accurate or approximately accurate, to divide unallocable common expenses of maintenance of way and structures where the cost results from weather stress, erosion, decay, etc. My reason is that it does not measure the use of the property by the two classes of service. The time ratio takes the elapsed time of the two classes of trains between terminals and takes into the freight train time 32 per cent of its total time, which is spent at stations doing stational work of various kinds, unloading freight, switching cars and the like and does not measure the use of the remainder of the common property, that is, the property between stations, which is the greater part of the whole; neither does it measure the use of the property at stations, because the greater part of that use at stations is on exclusive freight track. Thompson stated that freight trains travel 16 and passenger 27, miles an hour on the average. The freight train at 16 miles travels 23.47 feet per second, and passenger train, traveling 27, travels 39.6

feet per second. Assuming a bridge of 1000 feet, if 5.55 freight trains passed over in 24 hours, they would travel 5,550 feet on the bridge, consuming 226 seconds, or 3.93 minutes; and if 4.932 passenger trains passed over the bridge in 24 hours, they would travel 4.932 feet over the bridge, consuming 12.5 seconds or 2.1 minutes. A total for the 24 hours of 6.03 minutes out of 1,440 minutes, or .42 per cent of actual time, leaving 99.58 per cent of unoccupied time. The same proposition can be applied to any thousand feet of the track and all the track structure. In my opinion, the weather stress, depreciation and damage thereby, in that 99.58 per cent of time, should not be divided on Thompson's time ratio, but on the ratio shown by my table.

Thompson's time ratio assigns too much operating expense to freight and too little to passenger. To decrease passenger train speed to 16 miles an hour, making it the same as the

freight would increase the cost of passenger, but would not put passenger and freight on an equality, owing to the greater time the freight consumes at stations. Even then it would not fairly reflect a proper proportion of those expenses as against the passenger service. Thompson's time basis assigns about 29 per cent to passenger, and my basis would assign about 47 per cent. Before my basis is applied there should be set aside to passenger service any excess of the cost to maintain for passenger above freight service.

I take it that 25 per cent of these weather stress items should first

be set aside to the passenger service.

I don't think Thompson's time ratio 4 proper to divide unallocable property between passenger and freight, the reasons being the same I have just given relative to the common items of maintenance expenses due to weather stress. I believe my table, approximately furnishes the ratio on which to divide the common property between passenger and freight, with the proviso that any excess cost of construction for passenger service should first be set aside to passenger business. That answer also applies to unallocatable expenses due to weather stress.

To illustrate, with two trains a day over the entire line, one passenger and one freight, each makes a complete and exclusive use of the

entire property, regardless of speed.

DELF.

Cross:

I have attempted to, but have not made, any division of the advertising expenses. I might approximate it by doing some guessing. I don't see how Mr. Heiss could do it and be sure of his work. His guesses may have been a little different from mine. I haven't the result of one month, it was so unsatisfactory, I thought it

497 was useless to go ahead with it. Mr. Heiss took three years.

I think, on the division between inter and intrastate, Mr.

Heiss' figures are nearer correct than that arrived at by using the revenue train mile basis which we used. He endeavored to allocate

them by assuming that, if the advertising was in a Duluth paper, it was interstate business, and I don't know how he treated advertising in Michigan papers, it might be intra and it might be inter and In most cases the vouchers show the points at which the advertising is done. (It is admitted that Deft.'s Ex. 78, Heiss, "Advertising," are Heiss' allocations and that they represent Mr. Heiss' judgment of true allocations of how they should be assigned and that he would, if produced, testify to them, and to having examined the vouchers for the purpose of making them.) In dividing expenses of station employees on revenue train mile basis, there is no loading of, or addition to, the freight or passenger mileage to represent the time of freight trains in stational work. A considerable number of the passenger trains do not stop at all of the stations. revenue train miles used in my exhibit to show use are the revenue train miles found in my different exhibits in this case. The results produced by that exhibit bear the ratio to each other that the respective train miles in passenger and freight service bear to each This is so, inasmuch as I have divided each one by the same The result of this table and of train occupancy indicated by it is the same percentage as the respective revenue train miles passenger and freight bear to each other. In those train miles is nothing to represent switching, or excess time of freight trains in stational

work or the maintenance of exclusive freight trackage. The mileage is not produced on any of those exclusive tracks. The exhibit purporting to show the equivalent number of trains, takes no account whatever of speed; if the speeds of the passenger train had gone up 100%, with the same mileage, the results would have been the same. It would not vary as you increase or decrease the speeds if the mileages remained the same. This table does not represent the actual number of trains you would find on the track if you went out at any moment and counted them; that is indicated by Lindsay's table.

"Q. And if you went out and counted the trains at any particular time due to the fact that the passenger speeds are faster than the freight speeds, you would in fact find a different proportion and a greater proportion for freight than is shown by this table?

A. I believe I do. If we are counting the trains at any moment at different points on the road, the speed would have no effect upon the number of trains at all.

The Master: Wouldn't the fact that the freight trains take so much more time than the passenger, result in your finding more of them on a track at one time than you would of the passenger?

A. That would be uncertain, according to the time of the day, there might be at certain times of the day more passenger trains on the line than freight.

Q. Assume they are spread equally over the line?

A. I don't think you could make a count of that kind and get at any results as to the amount of your entire line which is occupied by your trains.

The Master: We are asking for the fact now, not for results; wouldn't the fact that the freight train moves at slower speed, result

in your ordinarily finding more freight trains on the track than you would passenger trains?

A. I don't know that that would be the case.

(By Mr. Wykes, resuming:)

Q. Let me ask it in another form Mr. Delf: you have 152,931 miles made by a passenger train; you have the same mileage set against the freight train in covering the line once each day for a year. Assuming that the passenger train made its speed twice as fast as the freight train, the freight train would be on the track twice as long, would it not?

A. Yes, it would be between the terminals twice as long.

Q. So to go out and count the trains actually on the track, assuming they spread over the track equally all of the time, the results which you have given wouldn't be the same as the number of trains which would be counted using the track?

Mr. Cotton: I object to that based on false assumptions and as incompetent, irrelevant and immaterial and not proper cross-examination.

A. If your freight train took 24 hours in running from terminal to terminal, and your passenger train took 12 hours running from terminal to terminal, if you took the last—and both started approximately the same time, or the one right after the other, beginning of the day, if you count after the expiration of 12 hours, you wouldn't find any passenger trains on the track.

Q. You would fine one freight?

A. You would find one freight and no passenger. You would find only freights, and yet that passenger train has used that entire

track just the same as a freight train.

Q. If you started out in the morning 4.9 passenger trains, and 5.9 freight trains and it took the passenger train 12 hours to make the trip and the freight train 24, at the expiration of 12 hours you wouldn't find any passenger train would you?

A. No.

Q. And you would find 5.9 freight trains?

A. That is true.

Q. So then assuming on your table the passenger trains making 20 miles per hour and the freight trains making 10 miles per hour, to express the number of trains that you would actually find on the track, carrying out this computation and assuming the service spread equally so as to have an equal number of trains on the track all of the time, you would find taking the year 1910, 4.9 passenger trains, and twice 5.9 freight trains would be the ratio of actual occupancy by trains, would you not?

A. No, I think not.'

Today is the first time I have testified regarding division of property. I applied the ratio given, in which the results are the same as the revenue train mile basis, but are derived from the number of trains using the equivalent of the entire line. I would first take out

the exclusively used property and to the common apply the same ratio as Mr. Riggs did. This process of separating the property originated with myself. This method of arriving at the ratio originated since Thompson's testimony but the applying of that ratio has been my opinion for a long time. That is, I have been of the opinion that the revenue train mile was about right for the division of the common property, but expressed as I have expressed it today, it came to me since Thompson's testimony. This basis doesn't give any expression to time of freight trains engaged in stational service, as usually and principally that property is allocated to freight.

501 Though there would be some of it that wouldn't be; it would be impossible to separate the stational service and find out what part of it is made on exclusive freight line and what is made on the common line. Whatever greater use there is of the common property in freight switching finds no expression in this percentage. It does not take into account the question of speed at all, and the zone of influence over which the train extends did not enter into my computation of less than one percent. If I use that zone of influence, that less than one per cent, might be extended to two or three per The track is there ready to serve any business that comes along, either passenger or freight and no business can use it except the passenger and freight service of this road.

I believe, in my previous testimony I explained that the excessive cost of maintenance due to the refinements of passenger traffic was an element which would weight the passenger side so as to make the revenue train mileage basis fair. This morning is the only place where I have suggested first taking out the element of so-called excess passenger maintenance; I don't suggest that as to those expenses due to wear. I know a lot of the South Shore ties rot out and there is rail cutting to some extent, though I don't know the extent to which the cost of tie deterioration is due to wear or weather. Deft.s' Ex. 80, Delf, is a statement prepared by Muller in the Western Rate Inquiry comparing the basis of allocation of Operating Expenses to passenger and freight as applied by different accountants in railway rate cases, to each of the 116 primary accounts.

This witness was later called to testify before the court.

502

On October 4, 1912.

MERWIN E. ASIRE, a Witness called by Plaintiff.

Direct examination.

By Mr. Eldredge:

I have lived, and been in real estate business, in Marquette for 31 years, and know value of property there. The 1,100 feet of water front belonging to South Shore, opposite Burt and Ely's Add., described on Complt.'s Ex. 6, Riggs, is worth \$10,000.

The 2,200 feet of water front owned by South Shore, inside the Harbor, extends from Washington St. to the north line of Ely lot, and includes sites of the ore, coal and merchandise docks owned by the company. That property is worth \$100 a foot front, or \$220,000.

The 800 feet of water front owned by South Shore outside the harbor is worth \$25 a foot. The 565 feet fronting on west side of Lake St., Jackson to Mesnard Sts., is worth \$20 a foot; the 170 feet frontage, west side Lake St., south of Hampton St., is worth \$20 a foot.

The 46 50-foot lots between Mesnard and Hampton Sts., 12 50-foot lots west of Division, at Hampton, and the 12½ 50-foot lots between

Jackson and Mesnard Sts., are worth \$200 per lot.

The 336 feet frontage on Lake St., Baraga Ave. to Washington St., is worth \$75 a foot; the 343 feet frontage on Front St., Baraga Ave. to Washington St., which covers end of South Shore, depot yard, two under and one over crossing, is worth \$400 a foot. In that valuation, I have included the property described on Complt.'s Ex. 1, Riggs, as 445 feet frontage on Main St., Front to Third.

The 184 feet frontage on Front, south of Baraga Ave., is worth \$200 a foot. The 14,608 square feet on Front to Washington and

Main, is worth \$40,000.

The property described in Complt.'s Ex. 1, Riggs, as 100 feet frontage on Baraga Ave., but which I think should be 200 feet, and that described as 150 feet frontage on Spring St., are worth \$12,500, valued together.

The 21 lots, Third to Fifth, are worth \$500 a lot, as are the 60 lots in the shop grounds, Fifth to Park Sts. These last two valuations are based on an average from Third to Park, as some of them

are not of any value.

The last description, containing 60 lots, is 500 feet by about 1,600 feet; I value this at \$30,000, independent of the fact that it is not platted. This figures 60 lots at \$500. The 21 lots, Third to Fifth, are not platted. I arrived at their value the same way as that of the 60 lots.

The 34 acre tract, south of Nester Add. west of the shops, is worth

\$900 an acre, as is the 36 acre tract south of Nester Add.

The land on both sides of right of way of north line,—the one straight up the hill to Negaunee,—from its junction with Dead River railway to city limits, containing 6 plus acres, is worth \$200 an acre. The land each side of south line to Negaunee, commencing at Hampton St., and running to the city limits, is worth \$250 an acre. The east city limits are about 100 feet further than the section line.

The South Shore runs in Lake St.; from the point where it leaves Lake St., and has its own right of way to city limits (about 11/4)

miles), the land is worth \$250 an acre.

Frontage on west side of Lake St., from north line of Ely lot to Jackson St. (1,000 feet), is worth \$60 a front foot. The frontage on west side of Lake St. from north line of the Ely lot to Baraga Ave. (1,100 feet) is worth \$30 a front foot.

The property I have valued is owned and in possession of South Shore at present. My values were based on a commercial value at present, or on a value prior to time that railroad was

constructed. There are certain portions of this land that were worth more for residence purposes 30 years ago than today. Those portions

are south of Baraga Ave., along the lake shore.

The property immediately south of Baraga Ave. as far as Jackson St., west of that, described as lots, I valued at present value. If the railroad were taken out, the property I valued as of 30 years ago would be worth those prices now, as it is desirable for summer cot-The other property I have valued commercially, without reference to railroad purposes. The value of the 336 feet frontage on Lake St., Baraga Ave. to Washington, which I put at \$75 a front foot, was based on a sale of 20 feet to Robertson, for a blacksmith shop, at about \$85 a foot.

The 340 feet frontage on Front St. now occupied by the South Shore passenger station would be good business property if railroad was removed. The lot in Spring St., extended east (about 40 feet frontage on Front St.), is worth \$10,000, half way through to Lake St. Take through to Lake St., it would be worth \$325 a front foot. In making these valuations, I have given only the naked value of the

I now have for sale 1,034 feet owned by Longyear, at north end of our harbor, at same figure (\$100 a foot) that I placed on the 2,200 feet frontage on east side of Lake St. The latter is more valuable property; in fact, there is none more valuable in Marquette. I would value the tracks described as 21 lots between Third and Fifth Sts. and 60 lots in the shop grounds respectively at the same figures I have given, irrespective of whether platted or not.

505 ASIRE.

Cross-examination.

By Mr. Wykes:

About 3,000 feet of water front on Marquette harbor, 2,200 feet of which is occupied by South Shore, is available for vessels. mainder is the Longyear 1,000 feet. No. 4 ore dock shuts out another 2,000 feet between the two properties. I have had Longyear property for sale 5 years at \$100 a foot. Its width is from 25 feet to 100 feet, back to M. & S. E. tracks. No Marquette water front has been sold in 10 years.

Mr. Longyear bought the 1,034 feet within 15 years. It is the old Burtine saw mill property, once used for lumber dock. When he bought it, he added to the docks, and it was used for a boat landing. He paid about \$100 a foot, and it has been lying idle ever since. He bought it before the M. & S. E. went in there. He already owned adjoining land; Lake St. was there then. There was about a block and a half between his residence and water front.

I haven't had a chance to sell the 1,000 feet in last 5 years. There is no immediate demand; I don't know that there would be any

more demand if additional 2,200 feet were on the market.

I included the land the tracks are on and all from Lake St. to water in \$100 value. The Munising Railway tracks are west of

South Shore tracks. The only thing I base the value on is that Longyear holds his at \$100 and South Shore tract is a little better situated.

The descriptions I valued as of 30 years ago are the piece from north line of Ely lot to Jackson St., another from the north line of Ely lot to Baraga Ave., and another from Jackson to Mesnard Sts.

I am 57 years old; 30 years ago, I was selling peanuts on a train, and made no sales of property. Marquette, 31 years ago, had 506 4,500 people; today it has 12,000. The land there was within corporate limits 30 years ago. The streets were about the same as today; 30 years ago, Ridge St. and those south of city were principal residence streets. Then, there was a summer hotel and several cottages about 300 feet north of north line of Ely lot, on

Water St.

The description, 1,100 feet water front, opposite Burt & Ely's Add., valued at \$10,000, is not presently available for water front use, and

has no value as water front property.

Description, water front, outside harbor south of south line of Ely lot, 850 feet, valued at \$25 per foot, is immediately south of 2,200 feet; there is on it a building, formerly a roundhouse, and a shanty. Part of shore line here is rugged, rocky and high, and part is quite narrow between water line and tracks, and in water near the shore are one or more large rocks 20 feet across; this 800 feet is outside the protected water front. The 2,200 feet would all fall south of a line drawn at right angles to end of breakwater. The 850 feet and Standard Oil Dock south of it gets some protection from the breakwater; only a northeaster affects them, and they don't get the full force then.

The Spear buildings are on the 2,200 feet. The 850 feet is not devoted to any present use as water front; my value of \$25 a foot takes the upland back to the South Shore track, but does not include it. The track is from 50 to 150 feet from the water; there have been no

sales of water front property comparable with this.

Description, frontage west side of Lake St., south of Hampton, 170 feet, value \$20 a foot; it is 125 feet deep. There is a switch on it, no buildings.

In Lake St. are two railroad tracks, taking half the street; Hampton St. is 60 feet wide, with cheap cottages on south side, somewhat aged, there for 20 years. On Lake Street, south, is a little better class of houses; can sell 50 foot lots, better located in Marquette, for \$1,000 at present; my value of this description was

as of 30 years ago.

Description, 46 50-foot lots, Mesnard to Hampton Sts., I valued at \$200, present value; they lie immediately west of previous description; valued at \$20 a front foot, with a street, and maybe several lots between. 30 years ago, the water frontage was worth considerable money; I don't think these \$200 lots were worth that much 30 years ago.

I don't see how I could put a present value on that land now occupied by the railroad; I could only do it by assuming the railroad

was away.

I have recently sold lots on corner Jackson and Adams Sts., on Blemhuber Ave, and on Hampton St. Description, 343 feet on Front St., Baraga to Washington, valued at \$400 per front foot, average; this is of varying depths. I don't remember the figures I made in arriving at the \$400 a foot; I took everything from Front to Third Sts., except the underground cut on west side of Front St. I did not value frontage on Main St., Front to Third, separately, but included it in Front St. frontage. The most valuable part of Marquette is Front St., Baraga to Washington, and Washington, to Third; values on Washington and Front are about the same.

The only vacant property on Washington St. belongs to Wm. O'Meara. I know of no property between Baraga and Third which has changed hands recently. About ten years ago, vacant property on south side of Washington, midway between Front and Third, sold for \$150 per foot; I know of no other sales within 15 years, except

one, about 12 years ago, on Washington St.

A citizens' committee (in Dec., 1911, and Jan., Feb. and Mar., 1912) made up a roll of all property in the city, and place l 508 values upon it, for the purpose of use in equalization before

the Board of Supervisors; the purpose was to find the actual calue of the property of the city. The committee was Wm. O'Meara, John Robertson and Arthur Palmer, and was appointed by the Council, of which I was a member. The purpose of the committee report was to permit city to go before the Board of Supervisors and show that the city was assessed at fair cash value; the reported figures were changed somewhat by the Board of Review, which cut it from \$10,-000,000 plus to \$9,000,000 plus, and became the assessment roll, mak-

ing this roll \$2,500,000 higher than the previous one.

The purpose of the committee and Board of Review was to get Marquette on the tax roll at fair cash value; I think it is now under valued; when finished, before review, I think it was nearer cash value. I think this report was fair, and gave approximate cash values of property valued, as far as I know; previously, the city was assessed at 50% to 60% of eash value, parts being on at nearly eash value and balance being low. The idea of the committee was to get whole city on fair cash valuation. After increase in valuation, Marquette was 15% of the valuation of entire county; it was 25% before.

I know of no sales close to the 34 and 36 acre descriptions within 5 years; I have been selling platted acreage for four years just outside

city limits, a mile further west, north of brewery.

I have sold 300 lots, four to the acre, at \$100 per acre; two or three have been built on. I have no acreage, and know of no sales, near those two descriptions (valued at \$900 per acre). I have lots for sale in Nester Add. The railroad property is across the street from some of the lots. The land is platted south of the east end of 34 and 36 acre tracts, with a few scattering houses.

The 12 lots, 50 feet wide, west of Division, at Hampton, are rough, about 25 feet higher than surrounding, and are worth con-

509 siderable less than average of \$200. ASIRE.

Redirect examination.

By Mr. Eldredge:

Dead River branch leaves main line and crosses West End Add. Between that and Park Cemetery is Nester's Add., which is well built

On the property east of cemetery and north of Washington are few vacant lots; Washington St. Park is immediately south of Park Cem-

etery, as are four blocks, well built up, of Nester's Add.

Homestead Add., not shown on Complt.'s Ex. 9, Riggs, lies just south of South Shore property and Nester's Add., and west of H. A. Burt's Add.

Fisher and Rock Sts. extended would run into Homestead Add.,

where lots, 5.5 to the acre, sold at \$200.

I purposely avoided examining tentative roll by committee. In saying that that roll arrived at approximately fair cash value, I judged from the totals and my confidence in the men making the roll; the equalization value of the Board of Review, at \$9,000,000, has no necessary connection with the property's true value.

The cheap houses on Hampton St. lots cost from \$600 to \$1,000. In stating that I had no other method of arriving at value of 2,200 feet water front than Longyear price, I did not accurately express my meaning; I could put a value on it if I did not know Longyear's holding price. I was influenced by the price he paid, and by the fact that 2,200 feet was more valuable. Without sales, I maye be able to say

that property has considerable value, taking into consideration fitness for mercantile purposes; it had the deepest water on the harbor, is located next to business center of the city, and is

protected by the breakwater.

If the docks and property of South Shore were taken away, this harbor front is still useful for many purposes; I base my values on all these considerations. There is an immediate demand for this property; when I stated there was no immediate demand, I meant I did

not know of any purchaser who wanted it at present.

Description, frontage west side of Lake St. north line of Ely lot to Jackson St., valued at \$60, lies east of Champion St.; value of lots on easterly side (1 to 16 of Champion Add., 50 x 100 feet) of Champion St., without improvements, is \$600 or \$700 each; I know of sales at that price. Value of these lots is diminished by railroad; if railroad were not there, the 1,000 foot could be platted, and lots would be of equal or greater value than those in Champion Add.

Description, 1,100 foot frontage on west side of Lake St., north line of Ely lot to Baraga Ave.; the north end could be used for business, and south end for residence, purposes; the property is not as

deep as the 1,000 foot strip.

Q. In reality, then, you haven't put a value on this property of what it was 30 years ago, but you have put a value on it of what, in your judgment, it would be worth today for other than railroad purposes, if the railroad was removed therefrom?

A. Yes, sir.

Q. And that applies to all of the property with reference to which you said that you had valued it on a value of 30 years ago?

A. Yes, sir.

Longyear purchased the 1,000 feet plus all water front be-511 fore the location of L. S. & I.; the South Shore was then opposite about two-thirds of it.

I have averaged selling 40 lots a year in Marquette for five years,

and in two years have built over 120 houses.

ASIRE.

Recross-examination.

By Mr. Wykes:

I would have put the same value on 343 feet of Front St. frontage. had I known it included undercrossing towards Washington St .-

approach to No. 4 dock.

On Nester's Add., at least 50% of the lots are built on. The lands I platted and sold near brewery were on N. E. ¼ of N. E. ¼, N. W. 1/4 of N. E. 1/4 and S. E. 1/4 of Sec. 16-a mile from center of city, and one-half mile from settled portion of the city. Champion St. lots are on a very high bluff; the railroad yards are at the bottom of the bluff, towards the lake and railroad tracks, a block away.

Q. Now, yesterday you made your value on three items here, that Mr. Eldredge has just interrogated you about, as being very positive that the valuations were fixed as of 30 years ago, and this morning you change that, and make the valuations as of today; which one of

those do you want to stand?

A. I didn't know that I said valuation of 30 years ago. I intended to say that the property was worth more 30 years ago for residence and commercial value than it is today.

Q. Mr. Eldredge's questions and my questions and your answers

all indicated that you were fixing values as of 30 years ago?

A. I didn't intend that. What I intended was to say that that property was, for residence and commercial value, worth more 512

30 years ago than it is today in its present condition.

I testified in the Barassa, Martel and Marketti case in NeI think I put values of \$100 an acre there through the swamp lands; I am sure I did not exceed \$200. It is about 1.5 miles this side of Negaunee.

ASIRE.

Redirect examination.

By Mr. Eldredge:

I am not as familiar with land values in Negaunee as in Marquette; in Negaunee, my value was with reference to farming purposes, and proximity to Negaunee, and on no other principle.

On January 8, 1914.

Asire recalled.

Further direct examination.

By Mr. Eldredge:

Valuing the right of way, from mile post 150.56 to mile post 151.92 (Complt.'s Ex. 1b, Riggs, and 1c, Riggs). I attach no more value from Chocolay station to the present Lakewood station, .11 miles, than to the sand plains, east of there. From the Lakewood station to the city limits, 1.35 miles, valued at an average of \$200 per acre. If that right of way was not used by railroad, it would be used for summer cottage lots. That average value is based on lots I have sold in Lakewood and Riverside Additions. I put a value below the value of the lots. The lots sold at \$100 per lot, averaging three to the acre. I sold about 40 such lots, within 6 years. I still own five or six lots, for sale, in Lakewood, and 25 or 30 in Riverside.

Valuing the track rights described under items 4 and 25, in Lake St., I value it, from the point where Lake St. is entered to Hampton St., at an average of 5¢ a square foot, 73,200 square feet, or

\$1., at an average of \$\psi\$ a square foot, \$13,200 square feet, of \$3,660. From Hampton St. to the north line Ely lot, \$42,000 square feet, at \$20\psi\$, equals \$8,400; north line of Ely lot to Baraga Ave., \$11,820 square feet, at \$30\psi\$, equals \$3,546; Baraga Ave. to Washington St., \$9,180 square feet, at \$75\psi\$, equals \$6,885. Washington St. east, \$22,660 square feet, at \$20\psi\$, equals \$4,532. Total value for the tract equals \$27,023. I took frontage values on the west side of Lake St. at a square foot price, and applied it to this. Those rights could be presently sold, at the price I have put on them, to the M. M. & S. E. Ry., in my judgment.

Mr. Wykes: I wish to object to the inclusion of any value due to the rights in the street, because those are franchise rights that only have a value that is given to them by the earning power of the roads and not by reason of any location or any use of the ground, because the ground belonged to the public.

Item 5 (Complt.'s Exs. 1b and 1c), Marquette County, is, in my judgment, worth \$5,000. I put twice that value on it. The storm of last November convinces me the water front has very little value there. Items 5 and 6, are worth \$20 per front foot on Lake St. I assume that the railroad is taken off this property, and fix its value for uses to which it could be put, basing my values upon what I believe the value of adjacent or nearby similar property. All my values, except where I give another reason, are based the same way. The lots in items 7 and 8 are valued at \$200 each.

The right of way from east line of Adams St. to east line of Catholic cemetery is \$200 per acre, and there to city limits \$25 per acre. From cemetery to the city limits, there have been no sales. In my judgment, it is worth \$25 per acre; I previously valued this at

\$200 an acre.

Item 10, I valued at \$800—four lots at \$200.

Item 11, I value at \$20 per foot front on Lake St.

In my judgment, item 12 is \$200 per lot, and item 13 is \$30 a foot front on Lake St., the entire distance. The chief value of this 514 tract is in about two-thirds of it, under the bluff, level with Lake St. The other third, in on the bluff back of the Champion St. lots, would have little value. (Stipulated that 1.50 acres lying west of red line across item 13 is not in railroad use.) The total value of item 13 is \$60,000. The deduction for part not in railroad use is \$5,000.

The value of item 14 is \$25 per foot front on Lake St.; the hard land is worth \$20 per front foot, without water rights. I add five

dollars for water rights. I value land across Lake St. at \$60.

Item 15, I value at \$100 a foot front on Front St. My previous testimony was an average of \$400 per front foot for all the property on both sides of Front St. If I previously valued item 15 separately at \$200 a front foot, I was in error.

The value of parcel 16 is \$30 per foot front on Lake St. It is not

so deep as property farther south.

Parcels 17 and 18 I value at \$10,000. My former valuation was a little high. Since I testified last, I purchased a tract on Baraga Ave., across the street from this frontage on Baragar, at \$40 a front foot. In my former valuation, I took into account abutting damages. My present value is without reference to damages to other property in any way.

Cadarette testified: The parcel which Riggs, in Compit.'s Ex. 1, and Hansel, in Defts.' Ex. 15, described as 336 feet frontage on Lake St., measures 346 feet. In Ex. 1b, the frontage on west side of Lake St., south of No. 5 ore dock, was given as 26 feet. It measures 46 feet. I had page 12 of Ex. 1c copied, and rearranged the allocations of item 19, to fully account for the 316 feet thereof, and left item 19 as originally prepared by Riggs, so that now there are two 19's covering the same property.

The value of items 19 and 20 (Complt.'s Ex. 1b and 1c)

is \$75 per front foot on Lake St.

(Plaintiff concedes that strip of land 40 feet wide, from Front to Lake St., which on the lake is a part of this 346 feet, is not in rail-road use. Riggs and Hansel gave the frontage on Front St., Baraga Ave. to Washington St., as 343 feet. It measures 354.2 feet. In item 24, Complt.'s Ex. 1b and 1c, the actual distances of separate frontages on both sides of Front St. are correctly set forth.)

Valuing the 2,200 feet of water front described in items 21, 22, 22a and 23, beginning at the south line of the water front and extending north 745 feet to the north line of Ely lot, the value would be \$55 a front foot on Lake St., and the balance \$125 per foot. Within those areas, each foot would be of the value placed on it by me. The land throughout the extent of this property has value independent of the water front; this 745 feet, \$30 for land and \$25 for water; the balance, \$85 for land and \$40 for water. The land

515

that I value at \$30 per foot is by comparison with land on the west side of Lake St. The land that I have valued at \$85 is valued at more than the land on the west side of Lake St., because it has a greater depth and is available for the same uses—for warehouse pur-

poses. It could also be used in connection with docks.

The land east of Lake St. within this 2,200 feet, would have a value if there were no water rights; my price on the west side of Lake St. per square foot, would be higher than on the east side. I added \$10 a foot for the extra depth. In valuing this land on the east side, I have considered rental values; the other element was the value of the property across the street. No comparison can be made in the values of this property and that north and east on

account of the depth of the water and that no available shore land goes with the property to the north and east. Of the next, 1,800 feet beyond this, only a small portion has deep water in front, and the next 1,100 feet has little solid ground; it is all water. The last parcel is probably from 20 to 30 feet, between Lake St. and the water. The first part, the half adjoining onto the railroad land, I estimate about 30 feet of land; the remainder is probably 75 to 100

feet of made land.

In item 24, the frontage on both sides of Front St. occupied by the No. 4 ore dock approach would be \$250 a front foot, and the frontage on the east side of Front St., occupied by No. 5 ore dock approach, would be \$200 a front foot.

Item 26 is worth \$250 per foot front on Front St., about 120 feet deep. In all instances where I value on Front and Lake Sts., and plaintiff owns all the way through, I give half the depth to each

street.

In valuing items 27 and 28, I would figure Jackson cut to be used for street purposes, and \$200 per foot on Front St., with a depth of 124 feet, the remainder to be fronted on Main St., at an average of \$200 per front foot—total, \$120,740. In my judgment, that represents the fair market value of that property at present if devoted to other than railroad uses.

Mr. Wykes: I wish to object to the method of valuing the back half of the last description, because it assumes conditions which do not now exist. The problem is to determine the value of this property by the values of the adjacent property; but the value as placed by this witness assumes a new set of conditions, the opening of a new street, and the figuring of a value on the back end of this with reference to putting it in the same condition as the main street of the town, and does not value it by its comparison with the adjacent property, which is the property nearer to Third Street.

In my judgment, item 29, included with that portion of item 24 on the west side of Front St., is of the value of \$40,000. I would change the depth of the property fronting on the west side of Front St., in Item 24, to make that 100 feet in depth, and use that remaining 27 feet in conjunction with the 14,000 square feet. I would not change the value of the 38.7 feet, \$250 per front foot. It is worth just as much for 100 feet deep. I would

increase the square feet in item 29 by 27 times 38.7, and value 15,653 square feet at \$30,325—a little less than \$2 per square feet. I would utilize that property in enlarging the stores on the south side of Washington St., which are all shallow—near Front St., about 60

feet deep, and at Third St., about 80 feet.

(Subject to objection as hearsay and secondary.) In order to arrive at values, since testifying the last time, I have talked with tenants, and asked them what additional rent they would pay providing they had a rear entrance to their store, or the store increased in length, and have verified my statement upon the rentals they said they would pay. There isn't any question that that property could be sold for the price named.

Item 30, including the site of the new freight house, is worth \$50 per front foot on Main St. extended about 500 feet front. If the railroad were removed, I would extend Main St. west from Third to Fourth. I think that would leave all this description on the north

side of Main St., except a triangle next to Third.

Mr. Wykes: Before he answers, let that be subject to the same objection that I made to his other extension of Main street in front of the station property, made yesterday.

On an average depth of 100 feet, it would have the same value on Main St. Main St. would be 60 feet wide—the original

518 width.

I base my price per foot on sales of property this last year on south side of Washington St., Third to Fourth. Mr. Goldberg paid \$1,250 for a 25 foot lot, and Anton Manthei sold a 50 foot lot for \$2,500, both vacant. I put the same value on this property as

on Washington St.

In my previous testimony, my value of \$500 a lot was an average value, all the way through, as residence lots, including the shop property. I didn't at that time intend to place \$500 a lot on that particular property. It was treating it as a whole from Third St. to and including the shop. The prices now put on would not be as residence property. The extension of Main St. would make it desirable for business purposes, the same as Washington St. If the railroad were removed, the property could not be utilized to bring about a substantially similar value as by extending Main St. with a frontage on Third St.

Mr. Wykes: I object to it as not being based on the proper conception of value, or of a method of fixing value. The property at present is affected with the condition, the railroad there, the kind of property that would be in a railroad yard, and it cannot be valued as an entirely different kind of property, with the railroad away, not fronting on Third street.

You would have two frontages, one on Third and one on Fourth, with great depth—500 feet. I don't think any property adjoining the railroad, Third to Fourth Sts., north of the track, is depreciated by proximity to the railroad. All lots on Washington St. abut the railroad and this property.

I value item 31 in the same way, by the extension of Main St., at \$25 a foot front on Main St. projected 60 feet wide. These lots would come on the north side of that street, and very little would be taken out of the railroad property. If I testified before as to the

separate parcels, and made all \$500 a lot, I was mistaken, and wish to correct it. I base my value of \$25 a foot front on Main St. extended on a diminishing value from the center of town and on the prices asked for property in the same block on Washington St. I don't think there have been any sales in that block, but this value represents my judgment and what owners are asking. For the first corner, they are asking \$50, and toward the west end of the block on Washington one lot is now offered at \$25, but there have been no sales.

Parcel 32, I value at \$250 a lot, or \$1,500 per acre—lots about 50 by 125. I previously valued this property at \$500 a lot, as I averaged

the property from Third St. west.

Of item 33, except 1.38 acres, the lots fronting on Washington St. are the most valuable. The 4.09 acres is probably \$1,500 per acre, on an average. The average of the whole thing is \$650 an acre to Lincoln Ave. and \$200 per acre from there west. The property on Seymour Ave. is one-half the value of Washington St. property. The second block on Washington St., in the Nester Add., is about one-half the value of the first. (Subject to scale of map, it is agreed that Ex. 1 should have stated 72.46 acres, instead of 70.46.)

The right of way of the Dead River Railroad, north Marquette, items 36 and 37, is worth \$200 per acre. I put the same value on

lands occupied by the mill tracks, North Marquette.

I have been in the real estate business in Marquette 26 years. I have been personally interested in eight different additions, and during that time have bought and sold property in all parts of the city, not less than 800 parcels altogether; also three additions at Chocolay.

520 Asire.

Cross-examination.

By Mr. Wykes:

I put Lakewood Add., at Chocolay, on the market four or five years ago—one row of lots from 240 feet to 700 feet in depth, with frontage on a bayou or Lake Superior. The lots run back to a 60 foot street parallel to the railroad. There are 17 or 18 houses on that plat. Every lot has a water front, either bayou or Lake Superior. I still have three or four lots for sale at \$100 to \$150 a lot; \$100 was the original price. Where I placed a value of \$200 an acre starts in the the center of Lakewood, and that is only 13 lots until we run out of Lakewood, and then the right of way is so close to the river or the bayous that it would have the same value as Lakewood or Riverside.

Riverside, on the market about four years, is on the river—51 lots, about one-half sold. The country adjacent to those additions is flat—nothing but pure lake sand. In buying a plat, and selling

lots, we figure the retail price will be four times what we pay for the property. That covers the cost of platting and selling, carries the investment, and leaves a profit. That is, in buying suburban property. On any addition, there is, incident to platting and putting it on the market, the waiting for sales, energy used in making sales, taxes, and things of that kind; so we must buy it in block much cheaper than we get for the individual lots. I sold those lots one-fourth down and \$10 a month, with 7%. The 7,100 feet that I valued runs to the city limits. Lakewood is on the north side and The railroad divides them. Riverside on the south.

In order to utilize the right of way through this 7,100 feet at the prices I have named, it must be united with the land on the sides. That is true of all these narrow strips I valued. I assume they would be united with the adjacent lands, with the exception of these par-

cels in Marquette that are blocks. I don't apply of necessity, that to blocks or lots in Marquette. I based my prices on de-521 scription 3 on the Lakewood prices. There are no lots adjacent to this strip until you get just where they enter Lake St., and

then there are lots across the street.

In getting my price of frontage for items 4 and 25, I took prices on the west side of Lake St. I figured, to obtain the 5¢ per square foot applied to 3,660 feet, the average prices of lots in Burt and Ely Add., which ranged from \$200 to \$400. I figured the square foot area, and divided it into the prices. I didn't use any particular I know what the asking price is and what lots have been sold for in Burt and Ely's Add., and on that I base my judgment. lots are about 125 feet deep. A number of lots extend up the hill, so I think, in figuring, I took 100 feet in depth. I think they are nearly all 50 foot frontage. I cannot tell where the lots were that sold for \$400, nor where they sold for \$200, nor what the propor-There have been few sales in that addition in late years. I have had, for two years, 10 or 12 lots then listed for sale at from \$200 to \$300.

That plat has been on the market 25 years; 60% to 75% of the lots remain unsold. There were no sales, to my knowledge, in the I don't think I have made any in four or five years.

brewing company sold a lot there; I couldn't say when.

Marquette has grown in the last five years, but all to the north. Any growth to the south has been limited to filling in a few houses in territory already occupied by houses. On Burt and Ely's Add., there have been no buildings built in the last five years. The last census shows 12,500 for Marquette, and the last previous census 10,050. Probably 30 new houses have been built during the last There are a great many lots around Marquette not yet sold. There are a number of plats lying to the north of what is shown on I have about 200 to 300 vacant lots listed with me Ex. 6a.

for sale. I had exclusive sale of those listed with me. I got the price of the track rights, upon which I placed 20¢ 522a foot, from the abutting property on the west side of Lake St., south of Hampton, and the first parcel north of Hampton. I based it on one sale, which is the only sale I know of on Lake St. That is in

the Edwards Add., on the property marked on the map, "Addn." with a "1" above it.

The entire 208 feet was sold. I used 175 feet depth, in figuring my square foot basis; the same of the property south of Hampton. I arbitrarily fixed the proportion of the price attributed to the front part of the lot. I did not reduce it to figures. I attributed \$20 a foot to the Lake St. frontage sold. In fixing my 30¢ price for track rights. I had no sale, but fixed that with reference to my own values. The same is true of my 75¢ price. I did not fix that with reference There was a sale in that district of a blacksmith shop to Mr. Robertson, seven or eight years ago, for \$85 a front foot.

The first building along Lake St. from Baraga Ave. north is a second-class hotel, on the corner of Baraga and Lake; the next is a dwelling; then an unoccupied store building; then a warehouse; then a dwelling house; then the blacksmith shop; and then the property of the South Shore, which is vacant until you come to the little office building. Those are just ordinary dwellings, renting at from \$10 to \$15 a month. My price of 20¢ from Washington St. east was not based on sales; it is my judgment. I do not know the nature

of the rights of the South shore in Lake St.

"Petition of the Bay de Noquet & M. R. R. Co. praying that they may be permitted to lay a R. R. track on Lake Street south to the Carp River and N. & E. to Light House Point, was presented. On motion Mr. S. P. Ely, Agent of the Bay de N. & M. R. R. Co. was allowed the privilege of setting forth the advantages of the privileges asked in said petition. On motion the prayer of the said petition was granted as amended by the Council as follows, to-wit: Right and privilege is granted to the Bay de N. & M. R. R. Co. to lay a railway track on the East, or water side of Lake Street, and to use or occupy said R. R. track, (reserving to the Village for general road

bed 30 ft. from the sidewalk, on the West and South side of said street), together with turnouts and crossings as may be 523 necessary for the convenient use of the same, by proprietors of manufacturing establishments, or the general public along the whole length of said street within the Village limits, from Light

House Point to Carp River.

I hereby certify that the foregoing is a true copy of certain proceedings of the Common Council of the Village of Marquette at a meeting held June 14, 1869, as found in the "Record of Village Proceedings" of said Village, Liber A, page 59.

Witness my hand and official seal at the City of Marquette, Michigan, this 31st day of December, 1913. SEAL.

DANIEL S. DONOVAN, City Clerk, City of Marquette, Michigan."

"At a special meeting of the Common Council held June 23d, 1869, petition of J. W. Edwards & others residents and property holders on Lake Street praying that a reserve of ten feet may be made on the West side of Lake Street for sidewalk purposes, was presented. On motion the prayer of said petition was granted.

On motion the Street Committee was instructed to have the Old Jackson Cut filled up where it passes under Front Street, the full

width of the street, at as little cost to the Village as possible.

On motion it was ordered that the Grant made June 14th, 1869, to the Bay de N. & M. R. R. Co. relative to right of way on Lake Street be so amended as to reserve ten feet on the West side of said street for sidewalk purposes, and that the said R. R. Co. shall leave 30 feet clear of the sidewalk on the East for general road bed.

Sept. 4, 1869. On motion the Street Committee were instructed to investigate the matter of building a bridge on Front Street across the old Jackson Cut, with plans for the same and estimates of cost

and report the same at the next meeting.

I hereby certify that the foregoing is a true copy of certain proceedings of the Common Council of the Village of Marquette as found in the "Record of Village Proceedings" of said Village, Liber A, on pages 62, 63, 64 and 78, respectively.

Witness my hand and official seal at the City of Marquette, Michigan, this 31st day of December, 1913.

[SEAL.] DANIEL S. DONOVAN, City Clerk, City of Marquette, Michigan,"

My valuation was based on the assumption that the company had something they could sell or transfer. I came here in 1881. That property was then in possession of the M. H. & O. R. R., and has continued in their possession ever since. I valued this as a railroad right, the value of it to the company for railroad purposes, rather than something that could be sold for commercial purposes. I made no examination of the earnings of the company, or anything of that kind, to see what it would be worth on that basis. I took into consideration and applied prices fixed by sales of the fee adjoining.

I fixed the value of item 5 with reference to adjoining lots and its water front. The price is dependent on my judgment. I didn't do any figuring to arrive at that as regarding lots on Lake St. I

think the footage value of adjoining sales could be used.

In valuing item 6, I used the sale, referred to before, by which I fixed the 20¢ price for track rights. This piece is nearly 400 feet south of that. My price assumes the railroad track to be taken entirely out of that territory. If it remained within 100 feet of those lots, they would still have that value. I don't think it would make any difference for residence purposes. The lots would be just as desirable, with a railroad track adjoining the property, for manufacturing, or any business that might want to locate, that required a sidetrack.

We have no land in Marquette on the lake shore west of Lake St. that is level, for manufacturing purposes. The new manufacturing plants have been obliged to go to the north of the city. For residence purposes, the presence of the railroad in the immediate neigh-

borhood takes off some of the value.

I assumed the lots in item 7 would be residence lots. To make

them salable at the price I fixed would require the removal of the railroad. If railroad structures were left immediately adjacent, the land would still have the value I fixed for residence purposes, as the lots are of that value, on the south side of Hamp-

ton St.

The value I placed on item 10 assumed the removal of the railroad and the return of the description to the adjoining parcels or lots, which are held by different individuals. There would be a good deal of work involved in getting rid of those and arranging transfers, as each adjoining lot is held separately. As it lies there in the shape it is, I cannot conceive of any value it has except for railroad purposes. I did not take these difficulties into consideration in fixing the values; I do not think I ought to. I think they are worth the prices I have fixed on them.

I assumed the lots in item 12 would be used for residence lots, which would involve the removal of the railroad, but would not involve its removal from item 11. The class of people that will live in that district will not always be affected by the railroad. They will not always locate elsewhere if they can get land at the same price. Men working for the railroad company prefer to be close to

their work.

I had no sales to assist me in fixing the value on item 13. I graduate that value down from my prices in the center of town. The next sales to that tract that I had was the Robertson blacksmith shop on Lake St. on the north and the Edwards property on the south. Item 13 is the only piece of ground level with Lake St. that could be used for manufacturing purposes west of Lake St. The Edwards piece is in the second block south from this property, and the Robertson piece about 3 blocks north. In order to make item 13 available for manufacturing, you would have to assume a railroad remaining on Lake St.

I got my price on item 16 in the same way. It is more valuable,

being closer to the center of town, but not as deep.

sale, right across from it, on Baraga Ave., 30 feet out of lot 17 or 18 on block 2 of C. I. & M. Add. The buildings on the south side of Baraga Ave., facing on the railroad, are store buildings, except a livery stable. Those next to Front St. are poor; after you pass the livery stable, they are a better class of buildings—fire proof buildings after you pass lot 20 of block 2. I put a value of \$12,500 on these two pieces, before taking into consideration the severance damage. I still considered these parcels would have some value by reason of the facility with which they could be added to the adjoining property, and we have taken an average frontage, reducing the actual frontage. I took both parcels to average a piece of 200 feet frontage by 100 feet in depth.

I put \$2,000 on the Spring St. corner of Spring and Third, and \$8,000 on the Baraga Ave. The first building west from item 17 is a fireproof store, used for meat market and harness shop. The buildings west of that are wooden dwellings, moderate structures, some unpainted. In figuring this irregular tract, I only take into account

so many feet frontage on Third St. and so many on Spring. I would not take more than half the frontage on Third. There would have to be some work done on that track to get it into shape in connection with other lots, which work would have to precede its being sold

to advantage. I value it as it is now.

I got my figure on item 19 from the Robertson sale, the only one made on Lake St. I don't think there is any other property for sale on Lake St. Those old houses on Lake St., toward the south end of that block, would not bring a rental to pay a return on that value. There have been no new structures in that block on Lake St. within 10 years. What I have just said in regard to item 19 applies to item 20.

On the 2,200 feet of water front, on items 21 and 22, I added \$10 a foot land value to the value on the west side of Lake St., and the value of the water frontage is my judgment, scaling it from the center of this tract south. The water front at the center would be worth more than further south. There are two other sales I know of on the west side of Lake St. One is on the corner of Main and Lake, to the L. S. & I., 110 feet on Lake and 140 on Main, with a structure on it, for \$7,500; the other is on the corner of Washington and Lake Sts., to the L. S. & I., 278 feet on Lake by 105 on Washington, with a two-story structure, now used for the depot and general offices, for \$50,000.

I valued item 24 as half way to Lake St. on the east side. In my estimate of \$40,000 from Front St. to Third, I estimated this at 100 feet depth fronting on Front St., which would be of the same value as 124 feet, in my judgment, on parcel 29. The depth of the stores on Washington St. is 94 feet at the corner of Third, and narrows down, on the curve, to about 55 feet at Front—74½ feet average depth. About 200 feet east of Third St. would be 90 feet in depth.

In uniting the Jackson cut to item 27, and using item 28 as a street, I did not take into account that there was something like 10,000 yards of excavation in that cut. It wouldn't cost anything to fill the cut, if we were to use the property in the way suggested. The excavating of the basements for the store buildings fronting on Front and Main, together with other basements that would be excavated in a radius of six to eight blocks, would fill the Jackson cut. I can't answer how many years it would take to fill it in that way. It would not be necessary to construct that street, to build on Front St., and the excavating for your buildings on Front would fill in a considerable distance back on Main St. I assume a sale of this property at these prices in a reasonable time. The problem, as I stated it, assumes the sale of the parcels, the digging of cellars and putting in of structures, in the near future.

528 I recall two new buildings in the business section on Washington St. in the last five years. There are no vacant lots on Front St. The one on the south side of Washington St. opposite the Mining Journal was built about three years ago, by Fred Donckers, and the other one, on the north side, this last year. I only recall two other new business buildings within a quarter of a mile of the South Shore station in the last 5 years, on Washington St., between

Third and Fourth, south side. Within a radius of half a mile, there have been two grocery stores in the residence section erected on Third St., north from Washington. The building constructed by Marquette National Bank was finished two years ago. The station site would make 21 lots and 10 feet on Main St., and the frontage of about 140 feet on Front St. The stores in town vary from 18 to 25 feet wide.

In the industries of Marquette, outside the railroad, we have a sawmill, employing probably 50 men; stone quarry, 25; Mining Journal Printing Co., 25; Lake Shore Engine works, about 150; Longyear & Hodge, 20; and the two rock crushing concerns, 75, in the summer. There are quite a number of things that employ labor. It would take some little time to think of all of them. There is our life saving station; and the boiler works, 12 to 15 men. I assumed the property two blocks west of the station, and the frontage on Front St., Baraga Ave. and Spring St., would also be used for business. There are no vacant lots on Front St., in the business section, except the property owned by the South Shore.

There have been sales in the residence portion. There was a price of \$3,000 for 50 feet between Bluff and Ridge Sts., on the east sidethe side opposite the library,—about 150 feet up the hill.

529 In valuing items 27 and 28, I averaged the entire distance from Front to Third at \$200 per foot. The value would diminish as you went west on Main St. to Third, with the exception of the corner. I did not locate my values. I just made an estimate, from the value of Washington St. property, that the property on Main St., handled this way, would be worth as much as the property

on Washington St.

The two principal business streets of the town are Front and Wash-The last sale on Washington was next to the Opera House-\$9,000 for 48 feet, or \$187.50 a foot. I would value the lot on the south side of Washington St., next to the corner of Third, at \$135 a front foot, which is the valuation I would place on the corresponding lot on Main, if that change were made. The \$9,000 lot occupied by me is 150 feet deep, but only 110 feet is used. That was the last vacant lot in that block on Washington St. On Washington St. immediately west of that block, and directly north of item 30, are the postoffice and the city hall. The lot sales directly north of item 30 on Washington are across from the city hall, west about 150 feet. That is where a new building is going up. I apply the Washington St. prices to the property on new Main St.

When I get farther out in the country, on description 33, I give the Washington St. frontage a value of more than twice the value of the property just off of Washington St. That property is so far from the business portion of town that it would not be used for business, and is not nearly as well located for residences as the Washington

St. property.

In the prices I have fixed for that part of the property available for business, if the railroad were moved, I did not assume all those parcels would be sold at the same time. I think there are eight buildings on Front St., Washington to Baraga, occupied as saloons, and three on Washington St., in the first block off Front. There are no vacant stores on Front St. today. The property next to the livery stable, once used for a moving picture gallery, has been out of use a few months. I asked tenants on Washington St. how much additional rent they would pay to have a rear entrance to their stores, or the buildings extended. Delf said he would be willing to pay \$5 a month, simply for the rear entrance, and the moving picture man said he would be willing to pay a considerable addition if he could have his building extended. No one else named the amount of money they would pay. I interviewed none of the owners.

In valuing items 30 and 31, I figured 500 feet at \$50 from Third to Fourth, and 526 feet at \$25 from Fourth to Fifth, and the triangle, about 50 feet on Third St., at \$50-total \$41,550, as compared with previous value of \$10,500. If the railroad was taken out in order that the other parties could handle their land, they would have to have the street just the same as this land; so I made no allowance for It is my understanding that 20 feet of the proposed street would be on railroad property. I assume that the adjoining owners would join in putting a street through, without cost, and give the The 40 feet between Third and Fourth St. all comes other 20 feet. out of the railroad company. Before you get to Fourth St., you must run out of railroad land, if you continue Main St., and the land that abuts that on the south will be equally benefited with the railroad lands, while the street all came out of the railroad land. After you pass Fourth St., 20 feet must come out of adjoining property, and 20 feet out of the railroad company. I do not care to change my value on 30 or 31.

I do not remember of ever saying that it was necessary to give the entire width of description 29 to the lots fronting on Washington St. Some of it would be applied to property that fronts now on Main

St., and the property at the west end of this cut would have 531 a rear end, which they need. It might not be necessary to increase the length of those stores, because the stores at the west end of Washington St. are much deeper than at the east end. In my estimate of the value of parcel 29, I contemplate adding some portion of it to lots that now front on Main St. For the purpose of the building fronting on Main St., the land would not have a value That was my average figure. It would have of \$2.50 a square foot. To determine a fair valuation, I have applied to that strip Washington St. prices, as indicated by the value of the lot under the building I am now in, in conjunction with the rentals that would be increased, to determine a fair valuation of it. The property used by the building I am in is \$2 a square foot, for 100 feet. into consideration the entire 150 foot lot, it would be less.

In order to get the price I put on item 32, it would not be necessary to acquire the narrow lots on the north on Washington St.; \$1,500 per acre is only \$250 per lot, and that could be subdivided by putting in streets, and sell at that figure. To plat it to advantage, it would be better to run the streets through it, so as to make Sixth and Seventh

Avenues continuous. That would involve purchasing some of the short lots. You could enter it from Fifth St., and plat cross streets that would conform with these streets, which could be opened later on. You would then have an opportunity of getting out to the east and south. You would want to plat it, so as to give lots at least 120 feet in depth; which way it would plat to the best advantage, I could not tell without figuring. A street running east and west, lengthwise of the property, would be necessary, and two cross streets, 63 feet wide.

In fixing my values, I have first assumed the taking of the property out of railroad use. Where I found a strip of right of way not big enough to plat, I treated it as going to the adjacent property, and fixed my value on that basis. In putting a value on item 30,

I assume that items 27 and 31 have also passed out of railroad use and go to commercial purposes. I also assume demand for this property. There would not be a demand for that entire property immediately. It is impossible for me to say how many new business places could be utilized at the present time, but I do know there is a demand for more business places in Marquette. We had an application within a month for a retail and wholesale candy factory; we haven't any property for them. This concern wants a store where they can retail candy. It would not be a good location for it on Washington St., across from the postoflice, because the bulk of our better stores are located nearer Washington and Front.

Assuming the reconstruction of the railroad yard, the property on Front St. would be used first, and, as soon as that was occupied, the property on Main St. ought to be as desirable as Washington. The business center at the present time is the corner of Washington and Front. The most valuable is from Main St., on Front, to Washington, and then west on Washington to the center of the block. If 600 lots throughout this area of location of railroad property had to be sold in a stated length of time, it would depreciate the value. I don't know about five years; I would not want to fix a period less than five

years.

The buildings immediately surrounding the railroad structures west of Third St. are not as good a type as you would find in other parts of Marquette, not affected by the railroad. The railroad affects the buildings and the character of the adjacent structures somewhat. Conditions in that respect in Marquette are no better or worse than in

any city of its size.

There has been no marked increase in land values in Marquette since I testified before. There is a general upward tendency in real estate prices, but it is slow in Marquette. There are always some lots on the market cheaper than others. Until those are gotten rid

on the market cheaper than others. Until those are gotten rid
533 of, the prices cannot go up much. The increase in values is to
the north part of the city. In the part of the city along the
railroad, it has remained about the same for the past 10 years. Lots
and property closer in have come a little closer to a market than a
year ago, due to increase in population. The lots I purchased two
months ago on Baraga Ave., for \$40 a front foot, sold four or five
years ago for \$50 a foot. The adjacent structures were then about
the same.

I base my value on items 34, 35 and 33 on a lot valuation. I diminish my prices from the Nester Add. out. I intended to go to the city limits with my values; at the extreme west end, value is probably

\$100 an acre.

In my valuations, I have intended to fix the fair market value. If I had 10 acres of land that I could sell for \$1,000 an acre in bulk, or could subdivide it and sell it for \$2,000 in parcels, I would say the fair market value of the land was \$1,000. If you owned 40 acres of land in Marquette, and wrote us what we considered a fair market value, we would fix that value at what we would sell the property for intact. The station ground and adjacent cut would be by the front toot or lot, because that is not a piece to be platted; it is altogether different from 40 acres outside. The value I fixed on the station ground is what it could be sold for in bulk. I would contemplate selling it in three or four parcels.

ASIRE.

Redirect examination.

By Mr. Eldredge:

I would expect to obtain from those three parcels the aggregate which I put on it, and I put on the lots west of Fifth St. what I consider a fair market value. My price there, on that acreage, is what I figure it is worth in bulk. I think it would retail for much more.

My price on the right of way from Lakewood station to the city limits and from the city limits to Lake St. was taking that property in connection with the adjoining property. My idea of the price is what it would bring in bulk to be added to the adjoin-

ing property.

In the building I occupy, on lot on Washington St. which sold, vacant, for \$9,000, there was a large amount of sand at the rear end—from 16 to 18 feet above Washington St., that sloped gradually toward the front about half the distance of the lot. That sand, I thought,

affected the value of the lot by \$1,000.

The price on item 31 was not based on a bulk sale, but a price it would bring after it had been arranged. The grading, curbing and macadamizing of the street averages about \$1.25 a lineal foot. I think a person buying this property would take that into account when buying, and pay the price named. If Main St. were widened in the way I propose, Front to Third, but not beyond Third, my idea of the value of the property, Third to Front, would be the same. If Main St. were extended, Third to Fourth, and not from Front to Third, it would unfavorably affect the value, Third to Fourth and west.

There were 15 acres of the tract on Washington St. originally bought by Hill, Cochrane and Miller, just this side of the Brewery land. West End Add. joins it on the east, but the property they purchased is not platted. They paid \$7,500, 15 years ago; \$200 an acre is a fair valuation of it. The price I fixed on the property from Fifth St. to the west line of section 23 was a wholesale price, and I would expect the lots to bring considerable higher.

535 Asire.

Recross-examination.

By Mr. Wykes:

These lots ought to retail at from \$2,500 to \$3,000 an acre, or \$500 a lot. Lots on Washington St. and Bluff St. sell at that price. There are no lots on Bluff St. less than that, until we get west of this line. Lots on Washington have sold for \$800 and \$1,000 opposite the shop grounds. I don't remember any as low as \$500. I do not think there is a lot on Washington St. east of Park Ave. that can be bought

for less than \$800. There are a few vacant lots there.

I got the \$250 a front foot on the Front St. end of the station property by the value of property on Front and on Washington. on the corner of Front and Main would sell for \$250 a front foot. would expect a less value as you went south. The business center of cur town is from Main St. north to Washington, and west on Washington to the center of the block, and I scaled it in that way. only sales I have are those made recently on Washington St. of a single lot, and not a large tract. I do not know of anything in Marquette of similar character to item 27 that has ever been sold in the shape in which I propose to cut it into three pieces. I did not fix my price with reference to its being divided into three pieces rather than into lots, because I did not have in mind the three or four pieces, but I did have in mind the sale to a party that might take the entire Front St. frontage. I can't name any possible purchaser. I made an estimated value of the land on Front and Washington Sts. adjoining this property, based on rentals, and not from sales; there has been only one lot sale.

536 Asire.

Redirect examination.

By Mr. Eldredge:

The growth of the town has recently been toward the north, but rentals on Front St. have increased from Baraga Ave. north. Business concerns aim to get as near Front and Washington as they can. Business has not started up the hill, north of Washington, to any extent. Some of the best stores in town are not south of Main St. Rose's has been improved within three or four months; two new fronts have been put in near there. The railroad track crossing Front St. at Baraga Ave. has a great deal to do with preventing the growth of the town to the south. Before the road was built, Baraga Ave. was the main business street. It is the widest thoroughfare we have, and a fine St., yet, property is not worth as much on Baraga as 30 years ago. I attribute that to the railroad crossing Front St. there.

On July 21, 1914.

ASIRE recalled.

Further direct examination.

By Mr. Eldredge:

I am the Asire who testified in this case previously. I know the plat of East Lakewood. When I valued 7,100 feet right of way of South Shore from Riverside station to mile post 151.92, I did not take into consideration value of land in East Lakewood plat. East Lakewood plat lies east of Lakewood plat, regarding which I testified and of which I was the owner. In fixing value on 7,100 feet, I used lots starting at center of Lakewood and Riverside, taking 13 lots in Lakewood and 15 in Riverside. My prices were all based on comparisons of lots west of center of Lakewood and Riverside Additions and west of lot 13 in Lakewood. The areas of lots in Riverside with which I compared were .78 of an acre and Lakewood 1.10 acres per lot.

537 When I fixed value of South Shore right of way at \$200 per acre, I didn't have those lot areas correctly in mind. I stated they would run three lots to acre. Having in mind correct acreage, the valuation should have been \$70 per acre, and I would change my value to \$70 per acre, to city limits. From city limits

west, to Lake street, my values heretofore given stand.

Referring to item 33, (Complt.'s Ex. 1b and 1c, Riggs, Marquette County, 72.46 acres, extension to shop grounds, I first valued this as 70 acres at \$900 per acre. I wish to correct my testimony. I am now at a loss to account how I made some of the answers I did in my second examination. I haven't changed my opinion of a valuation of \$900 on the whole tract; dividing the property into three tracts, the first, Park Avenue to Seymour, 25 or 26 acres, I value at \$1,500 per acre, average; from Seymour to Lincoln, \$650 per acre; and west of Lincoln, \$200 per acre. In the first tract, of the 15 acres I was asked to value, I would place part at \$2,500 per acre.

The two pieces on Complt.'s Ex. 6a, of 4.09 and 3.56 acres, I would value at \$2,500 per acre, average; the 7.15 acres between extension of Seymour avenue and shop limits at \$1,300 per acre; from Seymour to Lincoln avenue, \$650; and west of Lincoln, \$250 per acre. The 1.38 acre tract, in track to Sinclair quarry, I value at \$200 per

acre.

ASIRE.

Recross-examination.

By Mr. Wykes:

The 1.38 acres, quarry tract, is an irregular strip with 50 feet greatest width, extending through lands of others. I wouldn't attempt to put a value on a small piece. I took that as a whole. I wouldn't know how, and it would be difficult, to place a value on a

narrow, irregular piece like that. It wouldn't be worth as much as the same amount of land in a block.

As I remember, the second time I testified I placed the land, Park Ave. to Seymour, at \$1,500; Seymour to Lincoln, \$650. It is the north 7.5 acres, between Park and Seymour, on which I fix \$2,500 per acre.

When I get below that, to the 7.15 acres, I called that \$1,300. Dividing the Washington frontage into lots, they would range \$600 and \$700 per lot. The seven acres would have to be cut by a street east and west, and you would get a less price for the lots on that street than on Washington. I fixed those lots at about \$300 to \$500.

539 On October 5, 1912.

JOHN ROBERTSON, a Witness called by Plaintiff.

Direct examination.

By Mr. Eldredge:

I lived in Marquette 20 years, was once mayor. I have dealt considerably in real estate there, and am familiar with values. I know 1,100 feet of water front of South Shore, opposite Burt & Ely's Add.: in my judgment, its value is \$12 a front foot. I know water front property, 2,200 feet, inside harbor, Washington St. to south line of Ely lot; in my judgment, it is worth \$125 a front foot on the water.

I know 850 feet of water front just south of the 1,100 feet; in my judgment its value is \$30 a foot. I know frontage west side of Lake St., north line of Ely lot to Jackson St. 1,000 feet; in my judgment its value is \$60 a front foot on Lake St. The 1,100 feet west side of Lake St., north line of Ely lot to Baraga Ave., is worth \$30 a foot on Lake St.

Property on West side of Lake St., Jackson to Mesnard Sts., 565 feet, is worth \$20 a front foot on Lake St.; frontage on west side of Lake St., 170 feet, south of Hampton, is worth \$15 a foot; 46 and 50 foot lots, between Mesnard and Hampton Sts. average in value \$200 a lot, some are worth more and some less; 12½ fifty foot lots, Jackson to Mesnard, and 12 fifty foot lots west of Division, at Hampton, would average the same—\$200 per lot.

The 336 foot frontage on Lake St., between Baraga Ave. and Washington St., is worth \$80 per foot; 16 or 17 years ago, I purchased 17 feet frontage on Lake St. by 65.5 feet deep, next

540 south of South Shore property, facing the Lake, at \$1,400; it is worth as much now as then, and the 336 foot strip is of equal value.

The 343 foot frontage on Front St., Baraga Ave. to Washington St., except 14,608 square feet back of stores, I value at \$150,000; 184 foot frontage Front St., south of Baraga, I value at \$175 a foot on Front St.

The 445 foot frontage on Main St., Front to Third Sts., was included in my \$150,000. The 14,608 square feet on Front St., from

Third to Washington and Main, is the back end of Washington St.

lots in the cut; it is worth \$2.50 per square foot.

The 100 feet on Baraga, and triangle on north east corner of Third and Spring Sts., are worth \$15,000; in fixing that value, I took into consideration the damage to the lots crossed. The property between Third and Fifth Sts., east of the shop, I put at \$500 a lot of 50 by 150 feet, and between Fifth and Park Sts.—the shop grounds—at the same.

The value of the 34 and 36 acre tracts, south of Nester's Add. and west of the shops, is worth \$900 per acre; the 151.35 acres at north Marquette is worth \$32,000, and the Dead River Branch, to north Marquette, is worth \$200 per acre, as is the land on both sides of the

line.

The south line,—old M. & W.,—Hampton St. to city limits, is

worth \$140 an acre.

I own 22 pieces of improved and 10 pieces unimproved land in Marquette; I was member of committee appointed by the 541 Council to Make valuation of lands in Marquette.

ROBERTSON.

Cross-examination.

By Mr. Wykes:

I have had six or eight real estate transfers a year in Marquette, in last fifteen years: I had no transfers on Lake St., other than 17 feet mentioned, and none on Front, Washington, Main or Third Sts., in business section. On Baraga, 200 feet west from Front, directly opposite the triangular piece, and between lots 17 and 19, I bought six years ago, giving \$1,500 for 30 feet 105 feet deep, and I now own it. The triangular piece, across the street, valued at \$50, is of considerably less average depth; I did not consider that; I considered the depreciation—that the damage would be about equal to the value of the entire piece; I considered the property more valuable on that side.

I have had no sales or deals in property near Ely lot; I have had on Champion St., on the first table land—not in hollow with Ely lot. There, Champion is a pretty good street, with a good class of houses, and new ones going in; the price was on White's Add. on

west side of Champion St.

The Citizens' Committee, on which I served, began valuation work in November, 1911, and completed March 1, 1912; we estimated a little under the real actual value, keeping 10% to 20% under; that

was all the variation we intentionally made.

Q. Did your report read like this; that is, the part of the feport that accompanied the roll: "To the Honorable Mayor and Common Council of the City of Marquette: Gentlemen, The Committee appointed by your honorable body to place a cash value on all taxable real estate in the city, wish to report that they have completed their work and the roll has been opened for inspection to the tax payers of the city according to your order, and we wish

to report that we have inspected all the property and placed a fair cash value on same to the best of our knowledge, With this report we turn over the tax roll which we have made. Yours truly, A. H. we turn over the tax roll which we have made. Palmer, William O'Meara, John Robertson, Committee." Is that

A. I presume it is; I don't just recall it now, I think it would an-

swer ali right.

The above was read from a printed copy of council proceedings, marked official, and introduced as Defts. Ex. 3, Robertson, Oct. 3,

1912.

I don't remember that the Longyear description of 1,031 plus feet was valued by our committee at \$22 a foot; I don't remember that the Bessie Leggett piece—1900 feet—was valued at \$50 a foot. Grace Furnace is immediately north of the 2,200 feet of South Shore property; I don't remember that our committee put \$17 a foot on it. I were to get the value of the 2,200 feet in my own way, I would put \$500 a foot on part of it.

Q. And yet the property right next to it, your committee in fixing values that you say are 20% lower than cash values, that that is the only variation, fixed a value on the next

property to it of \$17 a foot; can you explain that discrepancy:

A. Why yes, I can explain it this way: It is the best portion of the harbor that there is, right on this point; as to that, I would put it at five; it has deep water, and it is protected, and there are no floods to bring in sand or sand bars.

They are, both of them, back of the breakwater?

A. Yes, both of them back of the breakwater. This particular spot I have in mind, I would say, would be \$500 a lot; it is deep water; never been filled in; there are never no obstructions brought in from storms.

In putting on the 1,100 feet water front in Burt & Ely's Add. a value of \$3.30 a foot, the committee was a little lenient, and took into consideration that the railroad was a public utility, for which we had use, and realized at the time we were putting a low value on it.

Q. Did you put a low value on the railroad property at the expense

of the other property?

A. Well, our work was subject to the approval of the Board of Supervisors, and if they didn't see fit to approve it, why, as I said before, it was a local affair; we did what we thought we were expected to do, what would be expected of us.

Q. Where did you get your instructions to favor the South 544

Shore railroad in your valuation?

A. We didn't get any instructions from anybody. Q. How did you know you were expected to do that?

A. Well, we know, pretty near long enough, the sentiment of the people of our city; lived there long enough, and acquainted enough with them; acquainted with local affairs, and with politics and political affairs, and otherwise, here—business affairs.

Q. You were going to use this on the Board of Supervisors for the purpose of indicating to them the true value of the city of Marquette, and in it had values that you now say were way off from cash value; is

that the fact?

A. We were going to use nothing on the Board of Supervisors. They were educated, learned, business men, and could judge for They went over our work; they approved some of it; themselves. some of it they didnt.

Q. But you furnished that first to the council as representing your judgment, over your own signature, of the fair cash value of this property, didn't you?

A. Yes, we made a report.

Q. You have answered this morning that the variation was 20%; that is, that it may have run 20% over or under what you would de-

termine was the real value; isn't that the fact?

545 A. We kept on the safe side of any strenuous protest that might came in from the taxpayers, but we couldn't value a piece of property-just determine the exact value of it; couldn't go to a man's house, and go upstairs and downstairs.

Q. So, because the South Shore, you thought, was an advantage to the community, you think on this parcel you put a lower value

than you did on some other property; is that the fact?

A. That particular portion down there we did. Q. Just because it belonged to the South Shore?

A. Not just because it belonged to the South Shore; if it had been any other railroad company than the South Shore, it would have been the same.

Q. Then, if it was a partial exemption extended to a railroad, how does it happen that the next piece, belonging to Caroline Burt, a private individual, is assessed at less per foot, if you simply granted immunity to railroads?

A. I don't recall just what.

Q. Hers is assessed at \$3, and this other description at \$3.30.

A. What is that description of Caroline Burt?

Q. 198 feet in front of lot 51 of Burt & Ely's Add. Now the Standard Oil-do you know what frontage they have got down there?

A. They have two descriptions; I just forget, now, what it

Q. They have one description of 180? 546

A. I believe it is.

Q. And you put a value on that of \$13, and that lays this side of the Burt & Ely parcel, does it not, belonging to the South Shore, on which you placed a value of \$12?

A. Yes, I think so.

Q. Did you also favor the Standard Oil in the same way that you say you favored the South Shore?

A. I don't know. I don't remember of us particularly favoring the Standard Oil.

Q. That is about right, is it, the amount that you put on the standard Oil?

A. I don't remember; I couldn't recall now.

My lot 30 feet on south side of Baraga, for which I paid \$1,500 six year sago, was assessed at \$1,200, I think.

In fixing value of property in Marquette, I took into consideration property rented around it, and what it was paying; e. g. north of Spring St. (corner of Front) is a property 44 feet wide, with a poor building, rented at \$170 a month.

The values by our committee were given a good deal of consideration; we intended to do faithful and good work, and get 10% and 20% under cash value; the principal exceptions were the railroad

property.

The portion of the South Shore water front between Baraga and Main Sts., 700 or 800 feet, is worth \$500 a foot on the water front; this was in the strip upon which an average of \$125 per foot was placed. I don't remember what value I placed on the remainder; it would probably be 300 feet, Washington to Main Sts. I don't know just what that is worth; I have not gone over it.

Q. About how much?

A. Oh, I wouldn't want to say. I had those figures; put them in separate basis. I would have brought them over; I haven't got those figures.

Q. I don't care to get it down to the last penny; tell me about what

you think it is worth?

A. Well, I don't know. Now, I didn't give it very much attention, because I was given to understand that this thing had to be got at an average.

Q. You got it at an average, and tell me how you got your average?
A. Well, I took those valuable portions at a certain figure, and I

took the balance at another certain figure.

Q. Isn't it a fact that, taking the 800 feet between Baraga and Main that you say is worth \$500 a foot, putting nothing else in at all, the average for the 1,100 feet, taken from the 800 feet alone, would be over twice the figure that you have fixed?

The Master: Do you understand that question?

A. Yes, I understand.

Mr. Eldredge: What 1,100 feet?

Mr. Wykes: I mean 2,200 feet. Let the question go. Did I say over twice? About twice, put it, instead of over. I want it answered-for the entire 2,200 feet. 548

A. It might be all of it, but there is a portion, I think I said Saturday a portion of it is worth-I don't know just now; I haven't measured it up accurately; there may not be 800 feet.

Q. It was your judgment, when you answered, that it was 750 or

800 feet; that is what you answered, wasn't it?

A. Well, I think I said particularly between Baraga Ave. and Main; that was the valuable front portion. Of course, taking out the footing of the ore docks, there wouldn't be that much; I forgot I didn't give this very much. I didn't suppose I had to give it in detail in this way; I went over it in that way.

The Master: You can tell about the distance from Baraga to

Main Street, can't you, approximately?

A. About 600 feet, taking out the dock out of that.

The Master: It would be on the 600 feet you would place a \$500 valuation?

A. Yes sir, I would say taking out the dock.

Q. You may take your own way for it, and tell me exactly how you figured out your \$125 a front foot?

A. Well, I don't remember, just as I said Saturday, about my other figures, I haven't got them with me; I think I can find them

though.

I did not know the Longyear frontage was for sale at \$100 per foot; I know, in a way, what he paid for it 10 years ago. I know of no other water front property on Marquette harbor and of no sales, except Longyear parcel, in 15 years, and I know of no 549 one attempting to purchase water front property in 10 years.

My values on upland are fair; I will pay \$300 a foot for 25 or 30

feet on Front St.

A 25 foot piece on Front St. would involve cutting into some

Defendants' Ex. 4, with dimensions of parcels where they appeared is as follows:

1. A piece of frontage on east side of Front St. at continuation of Spring St. (40 feet wide)	\$6,400
2. Overhead crossing on east side of Front St., lying next and north of Fav property	7,000
3. Underground crossing lying next and south of Main St. on east side of Front	8,000
 Underground crossing on east side of Front St. lying next and south of Marquette County Savings Bank (30 feet wide)	9,000 54,000
550	
the south line of Main, running south, at \$135 per ft. (125 feet deep)	24,300
7. 324 feet frontage on south side of Main St. between Front and Third, \$125 per frontage ft	40,000
	\$149,100

Description, 14,608 square feet on Front St., Third to Washington and Main, \$2.50 per foot, is the strip directly back of Washing-This description goes from Front to Third St., being ton St. stores. the approach to the northerly (No. 4) ore dock. The stores fronting on Main St. back to it on one side, and those on Washington on The value of the property consists in its being salable to persons owning stores on Washington and Front Sts., who have the other. valuable frontage, and are hampered for depth; I know it can be sold for the amount I put on it; it is 574 feet, Front to Third.

ROBERTSON.

Redirect examination.

By Mr. Eldredge:

The committee making valuations in Marquette occupied no particular official position. The Common Council and the people of Marquette believed the city was paying more than its fair proportion of county taxes, and the committee's valuation was to show that the Marquette tax roll was the fair value of the property for taxation purposes, together with the fact that we thought there was some property that had been included and was not on. We gave it a thorough going over, with a view to presenting the facts to

thorough going over, with a view to presenting the thorough going over, with a view to presenting the thorough going over, with a view to present the second of the second

tax might be reduced.

In the beginning, just as you said, we thought we were paying more than our pro-rata of the State and County tax. There were mass meetings in the city, the leading citizens and tax payers of the city held from time to time, and it ultimately resulted in a committee being appointed out among the tax payers, and a committee from the county, to work jointly and recommend something to the city—to the Council. They come in and recommended that there be a committee of three, whose judgment they thought ought to be good, in regard to values in the city, and they appointed the committee that done the work; that is about the way the thing come about.

Q. Now, that committee did not as a matter of fact attempt to

arrive at true cash values?

A. No, we never pretended to.

Q. Did I understand you to say that, with reference to industries within the city, like the L. S. & I. R., the Pioneer Iron Company, the Lake Shore Iron Works and the S. S. & A. R. C. you did not even attempt to place their property upon the roll that you prepared at 80% of its true value?

A. No sir, we did not.

Q. In other words, it was the opinion—state whether or not it was the opinion of your committee, that those industries should be

favored in taxation?

552 A. Yes sir, and we made that recommendation in making our report so that the Board of Review would know what we had done, and it was subject to their approval, if they thought it was all right.

The Master: Did you state that in connection with the certificate, did you put on your report that you had placed the property at its

cash value?

A. I don't know whether it is stated in writing, but I was there

when our report was presented to the Council.

The Master: How do you reconcile that with the certificate that you put on your report, that you have placed everything at its true cash value?

A. Well, I don't think our report is the true cash value, it was not the intention, anyway.

Mr. Butler: Was it explained orally?

A. It was explained orally in council meeting, the best of our judgment, and, in putting on those enterprises at a lower value that the rest, it was the best of our judgment subject to the approval of the Board of Supervisors.

Q. The exact statement that you made was, that we have inspected all the property, and placed a fair cash value on the same,

to the best of our knowledge?

A. That is right.

Q. It was not your intention to value any property, and you didn't value any property, that you knew was used for railroad purposes?

A. No sir, it was not our intention.

Where property was vacant and producing no income, we 553 did not in all cases keep our valuation up to 80% of true cash value; to make value takes a buyer and seller. In many places, we did not put what was offered for the property, or near 50% of what was offered, because we considered it unfair and unjust on some property that was non-producing. A geographical glance would tell that the Longyear property was not of the same value as the South Shore water front of 2,200 feet, there cannot be either egress or ingress; a part of it is rocky underneath, a short distance from the shore, and, in fact some part of it is rocky right to the shore; you cannot get to the shore. They would have to cut out South Shore dock No. 4, to get much benefit for dockage purposes. A part of Longyear property, out near the breakage, is valuable for water front purposes. You would have to build a dock out to it. The old lumber dock is the only part I know that is valuable-200 or 300 feet of it. You could only get in at one place-150 feet of it-with a railroad, as the hill is quite abrupt; it is not so easy of access as the South Shore property.

O'Meara lot is the only vacant property on Washington St., Front to Third, average value of frontage of vacant land here is \$250 per foot—somewhere along there; it takes a buyer and seller to make a

commercial value.

554 Robertson.

Recross-examination.

By Mr. Wykes:

When the committee for valuation of property in Marquette was provided for it was understood that the State Tax Commission was

going to put Upper Peninsula values on at cash value.

We were going over our city anyway, and thought we would get it up a little higher; we didn't figure the Tax Commission would put on values too high; we thought we would put it on pretty close to value. The committee was provided for by council resolution and compensation bills presented to council. We did not intend to discriminate between vacant and improved property; we acted among ourselves, as buyer and seller—if a man wanted to sell or buy, or it had to be sold under hammer, what it would bring, and kept a little under that. We figured that would bring it 10% under cash value, or something to that effect; property under the hammer is sometimes sacrificed. Front St. property would not go at much of a sacrifice, if so sold. Forced sale is not my idea of cash value. We fixed our determination that commercial value is created by a buyer and seller; with no purchaser the whole city is worth little. With South Shore tracks east of Front St. moved and its water front thrown on market, I don't know if it would be worth more or less than now; owing to the size of the town, and the ore fields within 15 miles, I think it worth just as much with tracks and South Shore removed; it would be in demand for some purpose as used

I know of no demand outside of railroad purposes.

I know of no other use this water front property could be put to, than for ore dock purposes; that is the commodity we have. The question of what it was to be used for didn't come up in fixing my values. We have more ore dockage in use now for other purposes than is needed; I don't know any other use for Longyear property than for ore docks,—I testified that it couldn't be used for that. I put a value on South Shore 2,200 feet water front for ore dock and other purposes; I know of no present use of Marquette water front, save by Standard Oil Company, and those who hold under South Shore railroad Co.

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On November 8, 1912.

CHARLES F. LOWETH, a witness called by Plaintiff.

Direct examination.

By Mr. Butler:

I am Chief Engineer of the C. M. & St. P. R., and Consulting Engineer for the Chicago, Milwaukee & Puget Sound and the Tacoma Eastern Railways, approximating 9,500 miles. I have been connected with railroad engineering since 20 years old, and engaged in construction work of all kinds at various times in many parts of the country from 1880 to 1901. Since 1901 have been continuously in employ of C. M. & St. P., being Engineer and Superintendent of Bridges and Buildings, 1901 to 1911; since then Chief Engineer.

I have given attention to the cost of reproduction of existing railroads:

(a) Since 1903 or 1904, to make the C. M. & St. P. returns to Wisconsin, Minnesota and South Dakota; for those returns I had charge of computation of values of the property in my department, including bridges, buildings, structures, water supply, etc.

(b) For last two years, have made an approximation of values of certain of our property in Minnesota, and our terminal property in Milwaukee, Chicago and elsewhere, and at present my department is valuing this company's properties in Illinois and Iowa; this work has been under way nearly a year and is approaching completion.

I have had much to do with acquiring right of way for C. M. & St. P. and have become familiar with prices paid and their relation to the value of the same and like lands for other purposes.

In Michigan Upper Peninsula, the St. Paul has approximately 100 miles of line. We are now building 25 miles, Crystal Falls to Iron River; excluding small spurs, I have had charge

of building no other line in Northern Peninsula.

I am able to form an opinion of relation between cost per acre of right of way lands in rural districts, Upper Peninsula, to value of lands through which right of way extends; it ranges from possibly two to five times as much. The average in Michigan, along South Shore, of cost for rural right of way purposes would be not less than three times the value of land for other purposes. In cities and towns such as on South Shore cost of right of way and terminal lands would be from one and one-half to three times higher than market

value of same or similar lands for other purposes.

These opinions are based on my experience as a railroad man. On 25 miles being constructed in Michigan the question of mineral rights in our right of way becomes involved; Crystal Falls to Iron River, there is much mining, there being mines in operation and prospective mines, and much land supposed to be underlaid with ore. We have been obliged to take right of way subject to mineral rights; over practically the entire length of branch, we have nothing but surface rights, it being, in many cases, subject to right of owner to compel us to move our track, if necessary, to get at the ore; it is a revocable easement.

The line, Crystal Falls to Iron River, is through a territory subject to caving when surface is mined under. We protect ourselves by hauling in earth and maintaining track men there the entire year, to keep the track up; the settlement is gradual and slow, and covers about a quarter of a mile of the track. To my best memory, it has cost \$5,000 to \$15,000 to keep our track up

for several years past, over that quarter mile space.

For South Shore earth work constructed in 1911 or 1912, the cost would, in my opinion, be 30¢, or probably more. On our 25 miles being built in Michigan, this work was divided into two sections, approximately 11 and 12 miles long; on one section, clearing bids ranged fron \$45 to \$80, and on another from \$45 to \$96, per acre; the contractor securing the work was the lowest aggregate bidder, but highest for these items.

There were 14 bid prices for first section of 11 and 12 miles, with 136,000 yards. Low bid and contract let, \$157,875; high bid

\$218,410.

180,230 180,230 198,000 184,735 218,410 178,620 2200,000 188,365 175,685 188,265 Aggregate. 191,690. 2nd Sec. Rock excavation, per cubic yard. Solid. 1st Sec. (R., pp. 2813-2814 1.35 875 1.50 4775 2nd Sec. LOOSE. 1st Sec. 2nd Sec. 8 Grubbling, per square yard. តិន្សតិត្**តិ** 1st Sec. 2nd Sec. 8 8 8 8 (R., p. 2743) Grading, per cubic yard. 2375 275 31 297 1st Sec. 2nd Sec. 52.50 Clearing, per (R., p. 2742) acre. 52.50 45 559 BEG No. 6. 6

The overhaul was bid for separately on first section, and prices ran from 1¢ to 1.5¢ per yard; the bids were on the basis of the company transporting, over its own line, all men, tools

and equipment, free

To make estimate of cost of reproduction everything done should be included. On work done after contractor is through, I would limit the charge to construction to things of construction delayed to be done after line is completed; certain things can be done more cheaply when road is in operation. My remembrance of the specifications are that the loose rock classification would take the hard

pan.

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In constructing South Shore all at once, including entire railroad, I would expect the prices to average much higher, as a large amount of work devided between a given number of contractors leads them to believe there is going to be plenty of work in their line, and if they were not successful in getting work at the first letting, they were going to get it at some subsequent letting. On the 25 miles, contractors were anxious to get the work, and I have no doubt they made very low bids; if it were 25 out of 600 miles of line, the different sections would probably command higher prices. If a large amount of work is to be done in a state, the demand for labor will exceed the supply, and labor will have to be brought from a long distance, and it would command a higher price and cost more to look out for the labor and bring it in; all

the supplies would also command higher prices. The tendency would be to higher prices if the whole 600 miles of

track were let at once.

My opinion of the fair cost of track laying on South Shore, if reconstructed, would be \$800 a mile. My analysis of cost, from study in Iowa and Illinois, is: Train service, \$235.45; track laying machine, \$28; camp equipment, \$11.50; superintendence, \$10.50; machine gang, \$22.50; rear gang, \$51; front gang, \$53; surfacing and lining, \$115.50; loading at material yard, \$1.29; camp outfit, \$10; use of tools, \$8; maintenance of track during construction, \$98.50; and transportation of laborers, \$30; aggregate, \$803.

The item of contingencies in the cost of reproduction of a given property, should include those items of cost, whatever their character, that could not be seen in making an inventory of the property or which might be overlooked or by error or oversight omitted from such inventory and by the possible error in the unit cost that might be taken in making the valuation. The contingencies in making an estimate of the cost of a property to be built would cover those things which, due to the haste in which the matter was investigated, had been overlooked or which from the nature of the case could not be foreseen and provided for. I think that there is very little, if any, difference in the allowance for contingencies in the case of making an estimate of reproduction of an existing property and in making an estimate of the cost of property that was proposed to be built, for the reason that as we go over a completed property there are always some elements of cost that are not apparent. It is impossible to carry out any large piece of construction without accidents, accidents of such a

nature that they involve loss of life and property. Those losses enter in as one of the contingent items. In going over a completed 561a property it is impossible to tell whether anything of that kind

did happen or not, but from our experience in reconstruction When we built our line to we know that they certainly do happen. the Pacific coast our company spent between \$250,000 and \$300,000 to make trails and final roads across the Bitter Root mountains. needed them to get over the country in order to make our surveys and to get out contractors over it and to get the contractors' materials in. There is no evidence of that item of expense today except that the roads are there and belong to the public. It was a contingent item in The item of contingencies arising the cost of that construction. from the necessity of changing the routing of material forwarded to near points from that planned, anything of that sort, almost invariably comes in and sometimes in very large amounts in any large con-Another instance in the construction of our line to the coast was that we had anticipated taking all of our track and bridge material out over our own line and carrying the completion of the line out from the Missouri River through to Butte, Montana, and we worked on that plan until we got pretty well into the State of Montana, and due to difficulties which were unsurmountable, we had delays in our grading so that it was apparent that we would suffer a very serious delay in the completion of our line through to Butte unless we sent our material around by the N. P. road to Lombard and begun laying the track easterly from Lombard. That involved the paying of revenue freight on material for long distances, that was not a part of our plan. We are doing at the present time a large amount of new construction work involving 200 miles, more or less, of double tracking and new line construction in Iowa and a similar amount in Minnesota and South Dakota. We have been unable to get waterways completed, that is, bridges in and culverts in, so that in many cases the grading contractors have been obliged to leave openings in the embankments for these incompleted waterways or else to pile the material up at each side of the opening so that it could be put in

after the opening was in. That will involve either one of two things, the handling of a large amount of material a second time or the leaving of the openings and temporarily bridging them and the handling and filling them later. In many cases we have put in a construction for waterway which was not the most economical, because of the urgency in getting that particular job done. times involves a change of plans from the original purpose. There are unexpected difficulties that come up and we find that it is necessary to stop and back up and start again and that means the abandonment sometimes of work actually done. The contingencies in new construction of that kind are oftentimes very large and they are more than is usually the case in building construction or in any kind of construction where the work is concentrated, such as it is in a large bridge, where the conditions can be readly seen. The building of a railroad extends over a great many miles of country and sometimes it is difficult of access and the natural conditions are very variable and it is impossible, practically speaking, to anticipate all of the difficulties and so it is customary to add a considerable percentage for contingencies and after the road is built and an estimate is made of what it would cost to replace it, there are a great many things that legitimately and properly enter into the cost of the road that cannot be discovered. Open cuts are sometimes found where it was originally intended to build a tunnel or perhaps a tunnel was originally built. We had a case of that kind near Rosalia, Washington. A tunnel was built through a spur of the hill, I don't remember howlong it was, but six or seven hundred feet, as nearly as I can recollect, and before the line was put on a construction basis we found that the material was yielding, before it was put on an operation basis, and notwithstanding that it was a well timbered tunnel, we had to make an open cut of it. The costof doing that was considerable, because the time that it took to do it extended past the period at which the line had been

opened up for traffic, and that enchanced the cost of doing the 561c work. Another contingent item is that work of this character is subject to floods and fire. We are necessarily obliged to build across valleys and along streams. The time required for construction involves mony months, sometimes two or more seasons and floods occur and the work that is partly done is washed away and it has to be re-That cannot be guarded against. It is a contingent item. Our company had notable experience of that kind. We had our line approaching completion and some considerable track was laid between Deer Lodge, Montana and Missoula, right side by side with the Northern Pacific. They were building at the same time and there was an unprecedented flood and the loss to our company from that flood aggregated something in excess of \$600,000. It covered a matter of 75 miles or more, and about that same season we had on the other side of the Rock Mountains in the Jefferson River and in the Musselshell River, a number of bridges in which we had put in the piers and the steel work had been delayed and we were carrying our construction trains over on false work and a flood came and so much drift collected in front of the structures that the stream was blocked and our permanent piers and false work was more or less washed out and we had to replace it and in addition to the cost of replacing it was the delay to the work. Another contingent item was where a great many timber structures that were built and subsequently replaced by embankment, the intention was to make the embankments from the outset but there was no material available within reasonable distance by haul by contractors' outfit and it was necessary to put in timber structures to take care of our construction train service, and fill by earth by train haul. The inspection of the completed property after the lapse of some years would not disclose the original expenditures for the trestles. Another contingent item is classification for mate-There are many kinds of material which at the time that they rial. are opened up would properly be classified as loose rock or hardpan and yet after the surface is exposed to weather they

feld hardpan and yet after the surface is exposed to weather they resemble common earth and in going over a road and looking at the surface or slopes of the cuts one would say confidently that that excavation was made in earth whereas by going into it more thoroughly you would find that it was hard-pan or a considerable portion

of it was hard-pan. Another contingent item is the diversion of highways and private roads andwaterways for one reason or another It is necessary oftentimes to divert these, the cost of which involves extra right of way, extra grading, oftentimes the moving of buildings and structures of various kinds. After the work is completed, especially after the lapse of a few months or years, there is no evidence of the diversion of highways, farm roads, no evidence oftentimes of the diversion of streams. A great many contingent items come in from unanticipated or unforeseen expenditures due to delay in transportation of material or equipment or men. In the building of a railroad there are large amounts of material to be purchased and gotten in hand and it is necessary that they should be gotten in hand in their Track cannot be laid if we have an abundance of ties and have no rail or if we have the rail and have not got the fastenings. Track cannot be laid unless we have the material in hand for the bridges and the culverts. If the material is not there, then either the track laying is deferred and the force of men and equipment stands idle or an expedient is resorted to which costs in many cases a great deal of money. It is of almost daily occurrence that a contingency arises in which you cannot stop to count the cost. It must be met and overcome no matter what it costs and if the material is not on hand for a bridge the ties will be taken and they will be cribbed up, and the track carried over that way. Then after the track is over and the material does come, why those ties, track, will be taken out and the bridges put in. That is only one of thousands of instances of that kind, all of which add to the cost of the construction. They

cannot be avoided, or foreseen. They can be foreseen to this extent that we know that they will come in all large construction and likely to be met with but I say confidently that one who has not been right on the ground and seen and had experience with the:e conditions, can hardly realize the frequency with which they occur and the pressure that is brought to bear oftentimes to overcome them irrespective of what the cost may be. When we started to build our Puget Sound line, one of the first things that we had to do was to cross the Missouri River and we had to get our material across, not only our material, but all the contractors' supplies. We were in a country where there wasn't anything, you might say, and we had to build a temporary bridge over the Missouri River and our construction account shows that after we credited up as much of that temporary construction to the construction of the permanent bridge as was reasonable and proper, that we spent in excess of \$70,000, simply for facility to get a track across the Missouri River, that never would show up in any inventory that might be made of that piece of property today. The building of that bridge involved several contingencies. river is subject to rather rapid rises. It has a very strong current and we had an unexpected break-up in the spring, and we lost a partly completed caisson. It was swept away from its moorings, taken down stream two or three miles, and the cost of recovering it was more than it was worth and it was abandoned. We had several fatal accidents. The cost of that bridge alone was slightly over \$1,000,000, and we had, I think, two or three fatal accidents. In my judgment it would be conservative to put a contingent item of ten per cent on the entire cost in making an estimate of the fair reproduction cost of the Duluth, South Shore and Atlantic road in the Northern Peninsula of Michigan. While the contingent amount on some items might not be as much as 10 per cent on others it might very readily be much in excess. That would not include 10 per cent on the cost of or-

ganization and legal expenses and interest during construction and engineering and the like, but upon the physical items, the cost other than the overhead items. In my opinion the 10 per cent would be the average of all items and not the amount of contingencies applicable to each item. I think it is universal in making an estimate for new work, to allow for contingencies, add a percentage that cannot be defined, and it has been our practice to add 10 per cent, and to add 10 per cent after we had taken unit prices that in a measure made some allowance for the same. What is done will depend largely upon the thoroughness with which the estimate is made. The contingencies are variable, and you might build a hundred miles of railroad this year and have certain kind of contingent items and rebuild a piece of line side by side and of identically the same character another year and the contingent items be different. Contingent items depend upon the weather, upon labor conditions, and then again the contingent items, take for a hundred miles of railroad in one state, might be of a certain character and in another state they might be of still a different character. It is the unexpected that is covered by the contingent items. Contingencies would be a greater average on some classes of work than on others. For myself, I have gotten at the average by my experience and my observation. Sometimes the contingencies may not be as much as is estimated. At other times they may be much in excess, and an estimate of a certain percentage for contingencies I think from the very nature of the case, must be an estimate, and cannot be arrived at with any exactness.

I am as confident, as I could be of anything that has not occurre I, that in the reconstruction of the South Shore road, we would have casualties, accidents, which would involve injury to persons and property, which would be contingent items such as those I have mentioned, for work of that character, which would extend

through three or more seasons. It is also quite sure that there would be contingent items in the way of floods. There would be contingent items in respect to classification. I doubt not that there is considerable material, the exact character of which would not be evident on a superficial inspection of the property. I do not see how that extent of railroad could be built without involving diversions in the highways, in farm crossings, and in diversions of streams. Those contingent items would surely occur. There would be contingent items in connection with the construction of the road over or under or across other railroads, electric and steam; due to the crossing of telephone and telegraph wires which would have to be changed; due to the construction in the cities in which paving would be disturbed, water works pipe or sewer or things of that kind. There would be other contingent items, that would be more or less of the general character of those I mentioned. In my judgment there is a reasonable prob-

ability that these or a certain proportion of them will occur in every railroad that is constructed. The percentage would vary according to weather conditions, season of the year and character of the country through which the road was built. The contingent items would be smaller if all conditions were favorable, such as casualties, floods and things of that character. The items of farm crossings, highway crossings, of pavements in cities assume the passing through of a settled territory. If the territory is sparsely settled, the possibility of those items and the amount and percentage for them would be smaller, and for exactly the same reason, other contingent items would be more. There is, as I remember, the country, a large proportion of swamp land and soft land, the surface of which is soft and yielding, and there would be a more than usual contingent item in the increase of earth work on that account. The country traversed by the South Shore railroad is not as accessible for the getting of supplies and men as a similar length of railroad would be in many other sections of the country, and the difficulties of getting

labor and holding labor and getting supplies in, would be enhanced over and above what it would be in most any other section of the country, anywhere within a radius of 500 miles, or a thousand miles. Where the work is contract work, the contractor would bear the cost of casualties and they would enter into his price. If he was financially able to carry out his contract, he would bear that burden, but contractors are not always able to do that, and when they fail, the railroad company has a contingent item that often varies considerably. I think the conditions might possible be as favoralle or as unfavorable that the contingent items might be as little as 5 per cent and possibly as great as 15 per cent.

In rebuilding South Shore, legal expenses would certainly be incurred. We could not build a considerable piece of railroad without becoming involved with other railroads and corporations; there would be negotiations and contracts to be made with other railroads and corporations, rights to be acquired in cities and towns, ordinances permitting construction, the crossing of streets, etc. There would be demands from one source and another and claims

arising. There are highways to be changed, making necessary contracts with municipalities. In our line, Crystal Falls to Iron River, legal expenses are unusually large, because of difficulty of getting right of way involving mineral rights. So far we have assumed, on other overhead items, .5% for legal expenses, and I have not gone into it with enough detail to know whether I care to change that; it is probably conservative.

In estimates of cost of reproduction of parcels of railroad property, the item of organization, administration and general expenses is usual. While I have not analyzed that in detail, it is usually assumed at 2%, and I think fairly so. That is customary with engineers in work to be done and in appraisals of existing property.

The item of engineering is also usual; allowance of 5% on entire cost, except overhead charges, would be fair and reasonable. That is an average; engineering on equipment would not be that high, but the average of 5% is fair and reasonable.

The item of interest during construction is also usual, and is arrived at by taking a fair rate of interest for the period covered by the average amount of investment, and taking into consideration that loss of interest extends to and even beyond completion of the work. It extends until the property is turned over to the operating department.

To secure right of way and construct South Shore in an expeditious manner, having due regard for economy, and taking into account lack of facilities for access to the property, shortness

of the seasons, and extent of the work, it would take more than three or four years to complete; if it took three years, the entire expenditure would average an interest period of 1.5 years, or, if four

years, an interest period of two years.

As bonds of established railroads can be bought to net 6% or more, I do not see how South Shore could get the money for less than 6%, and it might have to pay more; this rate is conservative, interest on three year basis would be 9% and on four year basis, 12%.

LOWETH.

Cross-examination.

By Mr. Wykes:

We began construction of 25 miles in Upper Peninsula last spring, and I don't see how we can turn the property over for operation until next fall. Section 1 is 11 miles out of Crystal Falls; section 2

is the balance, to Iron River.

In reconstruction of South Shore, I am as sure as I can be of anything that has not occurred, that we would have casualties, accidents involving injury to persons and property, and contingencies for floods; I don't doubt there is considerable material, the exact character of which is not evident on superficial inspection. I don't see how that length of railway could be built without diversions in highways, streams and farm crossings. There would be contingency items connected with construction of the road over and across

other railroads, and crossing telephone and telegraph lines. In cities, both waterworks and sewers would have to be disturbed, and there would be other contingency items, more or less of the general character of those mentioned. There is such reasonable probability of these that a certain proportion will occur in every railroad that is constructed; they will vary with the conditions of weather, the season and the character of the country. If all conditions were favorable the contingency item would be smaller. The items of farm and highway crossings and pavements in cities assume the passing through a settled territory; if territury was sparsely settled, their possibility and the percentage for them would be smaller, and other contingency items would be more that the usual contingency item, in increase of earth work on that account; the inaccessability for supplies and men, difficulties of getting and hold-

ing labor and getting supplies, would be enhanced a ove what it would be in any other section within a radius of 500 or 1,000 miles.

In casualties, where work is done on contract, those that occurred on contractor's work would enter into his prices and he would bear

them.

If contractor on our 25 miles in Upper Peninsula injures someone, his 25.5¢ for grading must bear that, if financially able. If they fail, the railway company has a contingency item there that is often considerable. Under favorable conditions, the contingency item might be as little as 5%, and it might be 15%. From the

nature of the case, the contingent item cannot be stated with 566

certainty.

There are many items that might be treated as items of contingency that subsequent inspection for appraisal will develop—that there was an expenditure on account of something that could not be foreseen when the road was planned and contract let. If sufficient time is taken and expense incurred to make survey of the property, and all factors were carefully investigated, the element of contingencies would naturally be reduced, but that is rarely done. The degree of thoroughness with which such an investigation is made will

govern, largely, the extent of contingencies.

Q. The purpose of my question was not to indicate that you must go and take the measurements, but that the contingent item on a road like the South Shore, parts of it of comparatively recent construction, instead of going off into Iowa and Illinois and other states to furnish hypothetical cases of what might have come in by way of contingencies, the facts as to what contingencies actually occurred on this road can be pointed out, and so I wish to base on that this question: Assuming that a large part of the South Shore line was constructed as late as 1887 and after that, and people who were with the road when it was constructed are still alive, wouldn't a nearer approximation of correctness be arrived at by calling those people as witnesses as to what contingent items actually occurred that it would to speculate on them?

A. That would in a measure determine the contingencies, 567 But I contend that in a piece of construction ves sir. through the northern Peninsula and identical with the D. S. S. & A. couldn't be inventoried today and get all of the items or elements that entered into its cost. It seems to me impossible to do it. Conditions change, and you cannot tell when you look at an embankment how much is under the surface of the ground, on either side, unless you go to a very large expense and make tests and excava-

tions to determine that.

In any event, a percentage is necessary, and 10% expresses my judgment of one sufficiently high to meet the average conditions.

So far as I know the experience of the engineering profession, those things are to be expected and necessary to be provided for in one way or another. I might have enumerated many other contingency items, many of which would almost surely happen in Northern Michigan.

In our valuation work, we apply prices for labor and material as of 1911, the longer period being better than a more definite date.

For work done within last two years, we had records of original cost, and took them as a criterion of pricees assumed for valuation, in order that we could check up our assumptions for last year's prices with what similar material had or would cost under similar conditions.

I have not been over the South Shore for a couple of years; at various times I have been over parts of it, and I think at one time and another over all of it—some parts very frequently. I

was connected with the construction of Soo Line, Soo Sault 568 Marie to St. Paul, and part of my knowledge of South Shore conditions is based on knowledge of Soo Line. I was Consulting Engineer of Soo Line when built, and for several years after.

I accounted for variation from 72¢ to \$1.50 on solid rock, on our 25 miles, as there were 14 bidders; some were more anxious to keep their plant and equipment busy than others; some may have had work dragging over into this season, and were not anxious to take more without a very good price; contractors at beginning of season attempt to forecast the amount of work likely to come up and the necessity for them to make high or low bids to keep busy. Then there is the personal equation of the difficulty of estimating cost of

I don't think solid rock could be moved for 72¢ without loss, and the variation between 72¢ and \$1.50 was the difference in judgment of men willing to do the work. There is necessarily a variation in judgment of engineers as to cost of doing a particular item of work; while the 25% difference between two engineers would be a strange case, estimates might vary as much as that. There is no possibility of that difference in estimates fairly made by competent men; there might be, possibly, a variation of 10%; while there are very large variations in the bids for any one of these particulars, the aggregate of the bid, taking all of the work into account, is less than the

variation in the bids for any one item.

569 Q. Haven't you noticed that in the source you take for your price there is a variation of 10% or 20%; perhaps at times you might look to one source and find one price and to another source and find an entirely different price, and they would vary say 20%?

A. That is frequently the case; not always the case.

Q. I don't mean that it is always the case, and couldn't a competent engineer honestly take either one of those sources, perhaps? A. Well no, he would have no right to take the lowest bid.

On 600 miles of road, the competition would be restricted to a fewer number of contractors than the 14 who bid on 25 miles. don't think we would get competent, experienced, financially reliable contractors equal to half this number. It would be let in a single contract on the idea of sub-contracting; that is general practice. The advantage of this is to have men of ample means and financial responsibility to stand between you and the financial loss that may occur in dealing with small contractors.

In building up shoulders, digging out cuts, putting in side channels, etc., after work of construction is complete, the practice is to 570

follow I. C. C. rules, charging to maintenance all expenditures for keeping original standard of roadbed. Anything improving standard is a proper charge to additions and betterments. In cases where

original construction is incomplete, it is proper to charge to additions and betterments work which it was necessary to

complete.

If a bank was widened after completion, the charge would be to additions and betterments, while, if original banks were swept away by a flood the charge of replacing would be to maintenance. In a contract for grading 219 miles from Missouri River, in South Dakota to Black Hills, overhaul on earth work amounted to 7.5%. a part of the work in Missouri the contract price for filling bridges was 27¢ but the overhaul brought the cost to 50¢ a yard.

That would not be comparable with a line where they were making a grade, but it has a bearing, as every railroad has to fill in earthwork after contractor has gone ahead, leaving temporary bridges. Certain places are frequently found where the bank of earth is a long one, and a temporary trestle or bridge is made to carry the traffic for a while, and afterwards it is filled in at heavier cost than

The amount of subsequent filling depends on the country—if the contract price. ground it firm, little filling is required, if there are swamps and marshes, more is necessary. The 219 miles I spoke of would not compare with South Shore, as that was a cheap line, with narrow banks and shallow cuts.

The South Shore overhaul would probably be much more than 7.5%, whether paid to contractor or done later by railroad, as there are many swamps and marshes to which earth would be hauled from

long distances.

I have made no calculation with reference to South Shore. In fixing a price of 30 cents, I considered the item of over-571 The contract price was 23¢ on the first 11 miles, and 27¢ The overhaul on the first 11 miles was estimated at on the balance. \$3,660. The estimate on the last part was not complete, as we had not finished our profiles for the farther end of the work, nor some spurs and branches. Those parts not surveyed were called to the attention of the contractors when they made their bids. haul was one of the considerations inducing me to raise average prices to 30¢. The shrinkage was not considered for that would be included in estimate of quantities.

There has been a decided increase in the price of grading and labor. Last year, we paid \$1.75 a ten hour day for labor. year, we have paid \$2 to \$2.25. Labor today is higher than 10 years ago, but I don't think it is higher now than average for last 10

years.

A railroad is, in many cases, worth more than the cost of replacing it, as where it has a large and profitable business. For rate fixing purposes, an investor is entitled to a fair return on his investment, as it is not his fault if the business is not there. The investor is entitled to the same appreciation in the investment that could be fairly gotten in any other fair field of activity. Measuring value of

this road by reproduction cost, it would have been worth one price in 1906, when wages were very high, a lower price from 1907 to 1911, other things being equal, and a higher price this year, 572 when labor is again high. The fluctuations are generally

balanced by changes in other conditions, so the total value is not

greatly affected.

The general trend of prices of material and labor has been upward for more than ten years, but it is possible that the difficulties in reaching the country, and the poor construction facilities, would fully offset cheapness of labor and material years ago, so that the cost at that time would be as much as or more than, now. I think that is a general rule with railroad buildings.

Some items of expense, as labor and material, would be much heavier today than when our road was built, but rails cost less today. Real estate is also much higher, because the road developes the

country.

There is no question but that in the majority of cases the cost of reproduction new, today, would exceed original cost. This is due to the higher cost of wages and material and because every railroad must make constant improvements, which are charged to additions When I make that statement, I have in mind and betterments. original cost of everything today, as compared with reproduction cost figured as an appraisal. The general advance in prices is a serious problem which raliroads have to face.

The 30¢ I have figured for grading takes into account the fact that throwing on the market 600 miles of such work would

573 cause an increase in price, of 5%. If the work was done in sections, not all at once, this element would be reduced, but not as much, as the cost of reorganization is heavier; the labor supply is limited, and must all come from the south. I have built two ore docks at North Escanaba, since being with St. Paul. was enlarged after I got there, taking one season. It took two seasons to build the second one. It was possible to use the part finished at the end of first season; I don't know as we did.

The 12 miles of double track, Marquette to Ishpeming and Negaunee, and ore docks could be built within a year, provided plans were made to work at proper seasons. Plans would have to be completed in early summer, so work could be pushed entire eight months of open season; otherwise it could not be finished in one year.

On 200 mile Iowa contract, grading prices range from 20¢ to 29¢. The work was done in sections, the past year. The longest section was 20 miles. I have some of the data on those sections. In those contracts, the construction was along our presently operated line, and all material, machinery, labor, etc., was hauled to the camps by the company, without charge to the contractor. Spurs were built off main tracks, and tools and equipment delivered without charge. The cost of their delivery was heavy, but there are so many intersecting lines in Iowa that, had we not done this for contractor, he would not have had to haul his supplies far. In our Puget Sound

line, contractors had to take their supplies and shovels many miles across country. The prices always vary depending on

cost.

574

Competent engineers might vary on track laying and surfacing, depending on their acquaintance with the work, or by the attenuate of observation. It is a complicated question to figure cost of those

items, as many things enter which can be easily overlooked.

I would not expect two competent engineers, both honest, to come within 10% of each other on these items, unless both had been through an experience of track laying, recently, and had taken care to examine the question thoroughly. Even then, one may give a different weight to the same considerations than the other does. I used the best judgment I had in fixing my estimate, and I am not surprised that Riggs and I differ \$270 per mile. Other engineers have made it even lower than Riggs. This same uncertainty enters into other items of railway construction, and other engineers, whom I believe equally competent and honest, and who have had considerable experience, have fixed prices in some cases much lower and in some cases higher than Riggs and I have fixed.

I went into it with much care, and was surprised at some of the items that I found entered into the cost of construction. A more careful analysis might produce more. If Riggs valued the Marquette car shop at \$20,000 at practically the same time, in 1911, that it was built at a cost of \$16,000, that is too much varia-

· tion.

No general rule can be infallible when applied to specific instances.

In the application of the I. C. C. rules, the judgment of the engineer or auditor is exercised as to what account the charge is to be made to. Sometimes it is close to the line, and a consultation has

to be held.

If Riggs valued engine number 37 at \$3,366, and it sold in the same year for \$1,600, I should consider that an unreasonable discrepancy. The value should be gotten at with less difference than that. The trend of locomotive prices has been up for 10 years, as has the price of freight and passenger cars.

I stated 26.5% to be the aggregate for overhead charges, beginning with contingencies, including interest during construction at 9%, and ending with legal expenses. There have been appraisals which

fixed this lower, and some, I think, as high.

In reports to railway commissioners of Wisconsin, South Dakota and Minnesota, which I furnished for our roads, I used lower overhead charges than I have stated here, because it was a new matter then and we made mistakes. We reported engineering charge 4.5% in Wisconsin; 5% would be conservative.

There would be one to two years of taxes on the incomplete road not included in this valuation. The figures I reported in the other states for overhead charges might be one half less than those I have

given here.

But in Minnesota the report has gone through a process of evolution—at first it was made hurriedly, without a thorough examination; as more information was asked for, we have gone into it more carefully, and found omissions from former reports. At first we didn't know whether our report was to be used for taxation or rate making, and at all times we tried to make an honest

valuation. There has been little, if any, controversy between us and the Commission.

Engineers should not vary as much as the difference between \$60 and \$35 for bridge timbers in place. I have no doubt that on individual items there may be a greater variation than 10% between Riggs and myself; such a difference does not reflect on either of is. A difference of 25% may exist between engineers, both competent and honest; there should not be this much difference on the entire work. The amount of difference depends on the degree of investigation and reliability of data. I believe my information is full, and data accurate.

An example of obsolescence in bridges is a frequent necessity for replacing bridges intended for light traffic. Some bridges cost less to maintain than others, and this is the reason for replacement of many. I don't see how you could take into consideration the fact that the company intended to replace it next year, when you were fixing its value. A bridge is a composite structure, and may be continued in service indefinitely, by replacing parts that give out. In many cases, it is wise to replace the entire structure with a better one, ever

though it could be made to last longer.

577 If, at the date this valuation was made, South Shore intended to replace 73 of their bridges at once, the life of those bridges should be figured up to the actual date of replacement. have in mind a bridge on the St. Paul which we started to replace with a fill three years ago, but, because of wet soil, we have had to repair it and let it stand. You cannot tell how long it will take to finish the replacement of a bridge. In valuing the bridge mentioned, I should have taken as its life the period to which it could have been made to carry the traffic with reasonable repairs, rather than the period to which it was reasonably indicated it would carry it. last depreciates slightly, and either has to be replaced with new or there will be an increase in the cost of maintaining the tracks. There comes a time, after new ballast is put in, when it becomes worthless as ballast, or involves a slight increase in the cost of track upkeep. Whether or not it is worthless depends on whether the road can afford to buy new ballast. The old answers the purpose, but, in good railroad management, it should be replaced with new.

Ballast gradually goes into roadbed and makes it more permanent, but there comes a time when the roadbed has appreciated to its maximum because ballast is driven down into the earth and forms a

hardened coating.

That coating reaches its maximum value for all time, and does not increase the solidity of the roadbed after a certain period. That period is reached in 10 or 12 years, or less if the traffic is dense. But, even then, new ballast must be put on. In three years after ballast is put on, it may depreciate 25%, depending on traffic and standard of roadbed required. New ballast is put in because it is generally cheaper to put in new than to screen or clean the old ballast with ballast forks, as is sometimes done.

It requires heavy expense to clean ballast. That ballast gets mixed

with dirt is the reason for its depreciation; that is the function of the ballast.

Expense of maintenance is due, in a measure, to both train movement and action of elements. The relative effect of either depends on amount of traffic—the effect of weather on the roadbed where traffic is light is relatively greater. Climate also makes a difference; but, regardless of climate, a large percentage of cost of maintenance of way and structures is due to the elements. In many cases the ac-

tion of elements causes more damages than traffic.

Contractors' bids furnish good evidence of value of work, but you mush remember that where the bids are competitive, the price is forced down. Bids should represent range of value, if made by experienced men, without collusion. It would not be fair to take the bid on a certain part of the work, but it should be taken on the whole, as some contractors have special facilities for doing certain portions. In arriving at a fair price from bids, you should average those close to each other, and eliminate those abnormally high or low.

Taking the 14 bids for removal of rock ranging from 72¢ to \$1.50, I should start at the lowest and average on half or three fourths of them, leaving out the highest. That's a fair method, and should represent fair value of the work. You could average bids which were regularly graduated in this way also, but, in each case, I should use my own knowledge of the work and my judgment as an engineer. Each man's judgment has entered into his bid, but they vary from 25% to 100%.

In arriving at the price of 30¢ for grading, I took the price at which I let the bid and included my judgment of the overhaul, local conditions, etc.; a large factor in fixing the price was my own informa-

tion and judgment.

Some engineers have considered 17¢ a fair price for some kinds of grading. I think each railroad would have to be considered separately, as much depends upon conditions, and, if this were done, each location on a railroad would have to be considered separately.

We can use steam shovels for about 25% of the 25 miles we are building in Michigan. Steam shovel work is more expensive, because it is possible to do work which otherwise would not be attempted. By the use of steam shovel, taking it per yard, the cost is less than by other method.

The prices I gave were for 1911; there was little variation that year. The prices would have been about the same for two year

period (1910 and 1911).

Prices were generally higher in 1909, and have been higher in 1912. The bidding on this contract in the Upper Peninsula was in the spring of 1912. The prices are higher now.

580 LOWETH.

Redirect examination.

By Mr. Butler:

Referring again to the bids for moving the solid rock, they included clearing, grubbing and loose rock. You could not separate in that list of bids the range of prices for any one of the items and draw a fair conclusion, because certain bidders may have special facilities for doing parts of the contract. Each man bids with the entire work in mind, though on one part he may put a low and on another a high price. Bids cannot be forecasted, even where great care is used, as the contractor bids on his own figures and judgment. It is called an unbalanced bid, where there is great variation; engineers try to avoid such bids.

The roadbed appreciates substantially in value as an operating instrumentality if properly maintained for a period of years. Sinking of ballast down into soft places in roadbed like South Shore improves roadbed, and addition of new ballast brings it back to former stand-

ard, and makes it better than before.

It is a question of business policy whether a bridge in 60% condition, which can be maintained for an indefinite period by repairs and renewal, shall be taken out and replaced by a fill or better bridge.

The problem depends on traffic, financial power, policy of management, etc. Each instance must be decided for itself. Obsoles-ence may result from various causes. Even where rail was 100% condition, it might have to be replaced because of heavier traffic.

An old road, well maintained, is worth more as an operating tool than a new one, and it cannot be said that a road is worth less than cost, if economically built and well located. It is worth more as time goes by and roadbed seasons, although part of the life of its parts has passed. The appreciated value relates principally to roadbed, but could include structures, buildings and bridges. The organization of the road and its management also becomes more proficient. The value of the "going concern" depends upon location, efficiency of organization and facility for handling business in each case.

A partial investigation has resulted in finding that it costs a cent a yard, of grading done, to transport contractor's equipment and men. The overhaul on our contract amounts to 12%, or 3¢ of the 26¢,

which is the average price of both sections.

That contract consists of two sections, the length of one of which was known, the other not. The average is 26¢ now, which, added to 3¢ for overhaul and 1¢ for transportation, makes a total of 30¢.

I don't think the item of interest during construction should be lessened by earnings of road during that time on South Shore, because operation would interfere with construction, and make it cost more.

On our Puget Sound extension, we, of necessity, put on revenue trains before line was completed, because it meant the

building of permanent towns on the line resulting from heavy immigration that year. I don't see how we made any profit out of it, though I haven't the figures.

LOWETH.

Recross-examination.

By Mr. Wykes:

Ballast depreciates, to an extent. Part of the new ballast applied takes up depreciation of the old, and part improves the readbed over the old standard.

Where it is a betterment, it should be so charged, and not to oper-

ating expenses.

My price of 30¢ included overhaul, and no overhaul should be added after the application of that price. I think I stated yesterday, that there would be some overhaul added to the 30¢ including overhaul, I referred to the price we paid in Iowa. When I fixed a price of 30¢ on South Shore, I did not intend to include overhaul. I did, however, intend that the contractor would do the work without free transportation of men and material, as we gave in Iowa. (Mr. Wykes: It stands in the record that you answered me twice that you did include overhaul in the 30¢, and also that you made that figure of a combination of 26¢ for grading, 3¢ for overhaul and 1¢ for transportation.) If it so stands, I ask that it be corrected to correspond with my present statement.

When I say a road cannot be operated profitably during construction, I do not mean that, if a part or section of it is thoroughly completed and traffic is there, it cannot be operated profitably. That is the natural result of roads being constructed in sections. In such cases, operation should be profitable, and that part should be taken off the interest-bearing charge, and sustain itself.

584 (The parties admit that the 1911 value, as stated in Complt.'s Ex. 1, Riggs, is correct: Schedule 33, Miscellaneous Equipment, pages 279-280; schedule 20, Shop Machinery and tools (Mich. and Wis.), pages 213-219 and 317; and schedule 21, Roadway and Construction Tools (Mich. and Wis.), pages 220-225 and 317.)

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On November 15, 1912.

Albert H. Hogeland, a Witness called by Plaintiff.

Direct examination

By Mr. Butler:

I am 54 years old and live at St. Paul. I am a civil engineer, with 33 years' experience. I graduated from Lafayette College in 1877; have been continuously in railroad engineering work in Wisconsin,

Minnesota, Dakota, Idaho and Oregon. I am now Chief Engineer

of Great Northern, which position I have held ten years.

I have been employed by that road 28 years, in which time the great majority of its mileage has been constructed. I have been engaged in estimating cost of reproducing new its existing railroad properties. I am not familiar with South Shore, except that I know its location. Our road has much mileage in Minnesota, in vicinity of iron ore deposits.

The proper unit price per yard for removal of earth varies with conditions, the cheapest being on level prairie, where fill is light, where earth is generally put into the roadbed from the sides by grading machines, which reduces cost. The higher cost is present in more rolling country and where earth is taken from cuts to fills. In swamps the cost is greater because of wet soil and tendency to

settle.

The unit price on grading includes free haul for a certain distance, with an amount added for greater haul. Other things increasing cost are transportation of outfits, men and supplies, 586 ditching, channel changing, etc. I have investigated addi-

tional cost to a railroad over amount paid contractor.

We examined contracts and records of Great Northern lines built from 1894 to 1907, in Wisconsin, Minnesota, North Dakota, Montana, Idaho and Washington-total, 1,500 miles. Average grading price paid contractors per yard was 33.6¢; adding cost of transportation and extras charged against grading, the average cost per yard was 44.1¢ showing a difference of 10.5¢ per yard for every yard moved above yardage unit prices paid contractors to cover entire Total contract amount of earth was 47,278,121, the grading cost. price varying from 19.3¢ for earth to 94.7¢ for solid rock. Experience shows that we must add 10¢ a cubic yard, or, in this case, about 30%, to cover the entire cost. Average yards moved, per mile, was 30,000; amount of excess cost varies with the country.

In the 19.3¢ average, the bids vary from 13¢ to 36¢. I don't think there has been much change in price of grading in last 10 years, considering the use of improved machinery. A fair price for earth work in iron country north of Duluth is 36¢ a yard, without overhaul, force account or other extra charges. That is for heavy work, and yards per mile run more than 30,000. My estimate of 36¢ was based

on specific contracts, varying from 35¢ to 42¢ for earth work.

The estimate of reproduction cost of a railroad should include items for contingencies. We found that during 5 years, 1903-1907, the total amount of additions and betterments to the Great North-587 ern was estimated at \$25,223,738.65, with an actual cost of the work of \$29,096,067.47, an increase of 15.35%. timates were itemized in detail, and the engineers were familiar with the work to be done. That was the average; some actual costs fell below estimates.

The estimates were made by competent assistants, and the work carried out by different, best fitted, departments. I included 10% for contingencies in my inventory of Great Northern in items in which labor entered largely. Addition was not made to equipment items. The 10% contingency addition was fixed by me upon my investigation which, showed an increased cost of 15.35%. Mr. Morgan, State Engineer, allowed 5% for contingencies on everything, which amounts to more dollars than my 10% allowance on principal labor items. In that litigation, the attorneys for the State contended there would be no allowance for contingencies, disagreeing with their engineers; my examination was made because of their contention. If valuation has been done with average care, 10% for contingencies would be sufficient; otherwise not.

I intended this 10% addition to be made only on items involving a large amount of labor, and not on all items. An allowance of 10% for contingencies on all items has usually been given in appraisals where the estimate was not based on complete records. I added 10% to some items, only, because our records were quite com-

plete, and two thorough examinations were made.

We allowed 4.5% to cover engineering and legal expenses.

Engineering expenses had been included in equipment item;
4.5% was applied to right of way and structures along the track, not

to equipment.

In allowing for interest during construction we assumed it would require eight years to reproduce 2,000 miles of main line track in Minnesota. We allowed 6% a year for four years on everything except equipment. On that, we allowed 5% for two years. Mr. Morgan, State Engineer, took same periods, allowing 4%. The total allowed was 24% on all except equipment, and 12% on equipment. The court adopted Mr. Morgan's estimate of 4% a year. It now costs Great Northern 4.25% to raise money for improvements. It would cost more to obtain money for a new enterprise, without any credit; 6% would not be too high.

We did not consider depreciation; I do not think that should be taken into account in arriving at the value of railroad property. As an operating instrument, depreciation should not affect the value, e. g., Northern Pacific and Great Northern both have lines from St. Paul to Puget Sound, built for years, while C. M. & P. S. has built a line within two years. It is unfair to say either of the old lines was not worth as much as the new one. My opinion is that

appreciation of track, roadbed, etc., offsets depreciation.

The maintenance cost of a new road is greater than of an 589 old road, as roadbed of the latter is more permanent. The old road can be operated more cheaply than a new one, and the value of its use is therefore greater, assuming everything to be

equal.

We allowed nothing for taxes during construction. In Minnesota, taxes are on earnings, and are not applied during construction. If conditions were otherwise, I believe such taxes should be included. Assuming a period of four years, and that South Shore is paying \$200,000 taxes per year, the allowance should be \$400,000. I do not know whether a new road would be taxed in Michigan before operation.

HOGELAND.

Cross-examination.

By Mr. Wykes:

The figures I have given were made for the purposes of Minnesota There was a variation between me and other witnesses,

especially Mr. Morgan, on unit prices.

If a thorough examination of profile is made the contingency item would be decreased. The engineer should include in his inventory things visible and things he is reasonably sure happened. The items which could not be discovered should be covered by the contingency allowance. Every means ought to be used to discover and list items and quantities that have actually gone into the work; things should not be included that we do not absolutely know have gone into it, as it is covered by contingencies. I do not believe anything has

been included twice. In favorable country, years afterwards, where earth had gone into sink holes, out of sight, it would

be taken ca.: of in contingencies.

The unit price of 19.3¢ for earth was obtained by dividing the cost by the number of cubic yards moved, not including overhaul. Work done by the company was not included. The period covered was from 1898 to 1907, and all the lines on the system were included. There were 38 pieces of work, and the prices varied from 13¢ to 36¢. The 13¢ price was on a job in North Dakota, built in 1904; the next higher price was 13.3¢, for 46.97 miles in North Dakota. In getting the average, we multiplied the quantity on each line by the price per yard; those tables were all added and divided by the total yards, in order to arrive at the average price. A larger amount moved at the smaller price would have decreased my average of 19.3¢ or vice versa.

Some of my prices vary greatly, as, for concrete, from \$7 to \$12, depending upon length of haul, time of year, etc. Even knowing exact conditions, there would be some variation between engineers. I am not prepared to say, with the information I have and the distance I am away, that in a particular structure on South Shore conerete price should be \$7 or \$12; the same might be said of other

unit prices.

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In arriving at 15.35% as average excess, on certain contract work, of cost over estimated cost, we included all work done on system for years 1903 to 1907. I don't know that the work was carried out in each instance as contemplated; changes might have been made. In

some cases, the cost underran the estimate.

In 1904, actual cost over-ran the estimated cost 16.65%, 591 In 1902, 15.65%; 1905, 14.04%; 1906, 17.34% and 1907, 11.62%; an average for five years, 15.35%. The estimates of each engineer might vary from a minus quantity to over 40%. There is a large variation in the estimates which cover spurs, sidings, second track, bridge filling, new buildings, etc. It is quite likely that the

same percentage or variation would occur in estimates of a value of

a constructed property for purposes of appraisal.

The table I prepared was for the purpose of justifying a contingency item. The size of the contingency item would vary with the degree of care used. No general contingency percentage should be applied, as every case ought to stand on its own bottom. As a mere opinion, I should think that South Shore would be justified in using 10% on entire estimate; I know nothing of the conditions.

The amount of interest would vary with the amount of line to be constructed, as that would determine the length of time it would take. We figure interest for full investment, half the time. In Minnesota figures, we had 2,056 miles; as that mileage is diminished.

the time would increase.

HOGELAND.

Redirect examination.

By Mr. Butler:

After contractor goes away, the cost of removal of additional earth would be about the same as the contract price though, in some cases,

it might be cheaper.

The time required to construct a road would depend on conditions in each individual case and not entirely on the length of line. I was mistaken in saying that the C. M. & P. S. was built in 2.5 years. It took nearly four years; they worked from both ends, and transported material over two other parallel lines.

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On January 21, 1913.

JAMES MANEY, a witness called by plaintiff.

Direct examination.

By Mr. Butler:

I am, and have been, General Passenger Agent of plaintiff since Jan. 1, 1912; previously, from June 1905, I was assistant to General Passenger Agent. I have been with the company 29 years, having

been Chief Clerk and Rate Clerk in passenger department.

I am familiar with the road, its operation of trains, connections, etc. (Time card, effective Jan. 5, 1913, marked Complt.'s Ex. 56, Maney introduced.) Prior to that time, for some years, the operation of the trains has been substantially on the same general plan as indicated by that time table.

Trains going west are given odd numbers, and east even numbers.

(In answer to specific questions, witness testified to the following things with regard to trains, operation, etc.)

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Record pages	3680-81, 3694-95	3680-81, 3694-95	3680-81, 3695-96	3680-81, 3695-90	3682, 3696-97	3682, 3696-97	3682-83, 3697-98	3682-83, 3697-98	3684, 3699	3684, 3699, 3708	3685, 3689	3684-85-89	3685, 3700	3685, 3700-01	5000 0000	3686-3701	3686-3701	3687-3706	3687-3706	3687-88, 3702	3687-88, 3702	3688, 3704	3688, 3704	3690, 3707	3690, 3707	3690, 3707	3690, 3707
Time.	Day	:	:	:	:	:	Night	:	Day	:		:	Night			Day	:	********			: : : : : : : : : : : : : : : : : : : :	:	:	:	:		
Predominating business.	Intrastate	:	:	*	:		(1)	(1)	***************************************						4					Interstate		Intrastate		:	:	:	
Comparative character of business.	Fair compared with average; neither heavy nor light	Ditto	Good; above average	Ditto	Below average		Above average	Ditto	:	:	Below average	Ditto	Above average	Ditto	Good during 3 summer months;	rest of year, average	Ditto	:	:	Below average	Ditto	**	*			*	:
4 To-	Houghton	St. Ignace	Houghton	Marquette	Duluth	Michigamme	Duluth	S00	Marquette	Michigamme	Marquette	Ishpeming	Houghton	Nestoria	St. Ignace		Soo Jet	Soo Jet	S00	Houghton	Champion	Champion	Marquette	Soo Jet	Soo	Ishpeming	Marquette
From- 594	1 (c) St. Ignace	2 (c) Houghton	Marquette	Houghton	Michigamme	Duluth	800	Duluth	Michigamme	Marquette	Ishpeming	Marquette	Nestoria	Houghton	Soo Jet		St. Ignace	S00	Soo Jet		Houghton	Marquette	(i) Republic	(j) Soo	(f) Soo Jet	Marquette	12 (h) Ishpeming
Train No.	1 (c)	2 (c)	3 (a)	4 (a)	10	9	7 (8)	8 (6)	10	11 (4)	110 (e)	111 (3)	13 (1)	16 (f)	14 (g)		15	£3	4	103 (%)		105 (4)	106 (4)	25 148		6	12 (h)

(a) Negaunee to Houghton, cars are C. & N. W. and locomotives South Shore; train is operated over C. & N. W. line to Negaunee, where South Shore puts on its engine and crew. Train does local business between Negaunee and Houghton; South Shore gets all the fares, and some payment from C. & N. W. Sleeping and long cars between Negaunee and Houghton run between Chicago the Copper Country.

(b) Carry sleeping ears and diner.

(c) Dining cars entire distance; sleeping car St. Ignace to Soo

Junction.

(e) Sleeping car for Marquette from Chicago; this is a C. & N. W. train, operated by their crew and engine; South Shore gets the fare.

(d) Chicago sleeper via Champion and the C. M. & St. P.

(f) Connects at Nestoria with 7 and 8; sleepers out of Houghton on 16 for Duluth and Mackinaw; sleepers into Houghton, from Duluth and Mackinaw, picked up at Nestoria.

(g) Connects at Soo Jet. with 43 and 8, and at Trout Lake with

Soo Line.

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(h) Through route, Chicago to Copper Country, via Champion and C. M. & St. P.; does some local business between Champion and Houghton; handled by South Shore our crew and engine, and South Shore receives the revenues, and something additional, from C. M. & St. P. sleepers and diners.

(i) Same as note (h) except junction at Champion or Republic,

and no sleepers or diner.

(j) Connects at Soo Jet. with No. 1.

(1) Handle Lower to Upper Peninsula travel, and have a

good deal of sleeping car business for intrastate passengers.

Sleepers from Lower Peninsula are handled on 1 and 2 and not on 7 and 8; that sleeper goes to St. Ignace; 7 and 8 handles St.

Ignace sleeper to Mackinaw City.

Service substantially the same has been maintained on South Shore during past four or five years, except on trains 6, 8, 13 and 16. We are now operating daily sleeping car service between Houghton and St. Ignace, where, previous to a year ago, service was tri-weekly. There is no sleeper service in the winter. There are additional trains in summer. This summer we operated two Sunday trains between Marquette and Michigamme, 38 miles, and two between Duluth and Bibon, Wis., 72 miles, one each way—local for resorters.

I have frequently been over plaintiff's line in Michigan. I regularly receive, from accounting department, reports concerning results of operation of passenger trains, the earnings and the like; some are daily statements, and some more frequently; they have

reference to daily passenger earnings.

Monthly reports show earnings by trains. In a general way, I am able to form an opinion as to the volume and kind of business of these trains during the last three or four years. I have not kept any statistics.

Complt.'s Ex. 57, Maney, is a list of passenger tariffs filed with the Michigan Railroad Commission, in effect July 1,

1912, and is now in force. It correctly indicates the Michigan tariffs on file with the commission.

(Agreement that tariffs on file may be used by either party, by being produced and called to the attention of the opposite party.)

Complt.'s Ex. 58, Maney, is a list of tariffs on file with I. C. C., including supplements.

Practically all local normal fares in any state, sometime or another become a part of or are used in the making of, interstate fares or

Complt.'s Ex. 59, Maney, is the local passenger tariff of D. S. S. & A. in effect middle of 1911, with supplement 14 and was prepared by me, or under my direction, and states the fares and distances between all stations on our road.

Complt.'s Exhibits 57 and 58, Maney are lists of tariffs except one lately issued, effective June 1, 1912. (This tariff produced and

marked Complt.'s Ex. 60, Maney.)

In addition to the tariffs referred to, there is one promulgated by other companies, which passes from points on our line to points on With that exception, all tariffs promulgated by foreign lines are from points on the promulgating line to points on our line. Our tariffs are one way fares, as illustrated by Complt.'s Ex. 60. Fares between the same points in opposite directions frequently

598 Foreign lines, making rates from points on other lines to points on ours, use our local fare over the part of the line used in the route, as a component part of the through fare, in a majority of cases. The short line is the rate maker; the long line between the same points, to get business, meets that fare; that is uniformly the rule.

Between Sault Ste. Marie and St. Ignace, Soo Line furnishes a shorter route, South Shore being 90 miles, and South Shore and Soo Line, via Trout Lake, being 72 miles. I don't believe that we have

any other similar situation in Michigan.

In Wisconsin, although plaintiff is not compelled by law to carry passengers at 2¢, it is compelled to do so through being paralleled by competitive lines, which are on a two cent basis. The Northern Pacific parallels South Shore, being as near as two miles in places, Superior to Iron River, the distance between these points on N. P. being 43 miles, and on South Shore 45 miles. On points on South Shore two miles distant from Northern Pacific, it is necessary to apply the same fare as the Northern Pacific applied to station op-

Duluth to Ashland is also a competitive point; the N. P. is direct, Duluth to Ashland; our route is Duluth to Bibon, thence via C. St. P. M. & O., to Ashland. Our distance and fare, Superior to Bibon, are 67.1 miles at \$1.34. In my opinion, we could not maintain a three cent fare to Bibon. The N. P. is the rate making line, 99

Superior to Ashland; that handles business from Superior to Ashland by way of Bibon; the fare is in effect via N. P., hich would not permit us charging 3¢ a mile. We could possibly

maintain a three cent fare for short distances in Wisconsin, though not for any great distance. The N. P. competition holds us to its basis on all of the line west of Saxon, in both directions, which leaves

us free only between Saxon and the state line.

(Witness produced tarriff issued by foreign lines, showing rates from points on South Shore to points on other lines.) The rates read to points on our lines and to points on other lines via our line. They attempt to cover all gateways; e. g., Mackinaw City to Marquette, \$5.03, made up of \$.50 for Mackinaw Trans. Co. and \$4.53 for our local from St. Ignace to Marquette; that is uniformly true to points in Michigan through St. Ignace gateway.

On business through Soo gateway from, say, Buffalo, N. Y., the through fare would make over Chicago or Trout Lake and be applied via Canadian Pacific, through Soo. We would get per mile, about .0258¢, Soo to Soo Jct. we have to accept a prorate per mile, which

brings that down to the figure per mile stated.

This is an application of the rule that the short line makes the rate. This particular case would cover Buffalo and points in New York, east, where the through fares would make over Buffalo.

600 It would not apply to all territory naturally tributary to the Soo gateways; for the territory directly east, e. g., Montreal, Canada, fares would make over Sault Ste. Marie, and we would get our

full local, Sault Ste. Marie to Marquette, \$4.53.

If two cent law was put into effect the rate from Montreal to Marquette, made up of a combination of the fare, would figure \$21.20, being \$1.43 less than existing rate. I don't think we could maintain the interstate rate at the present amount if we were on a two cent basis in Michigan, as the passenger could buy to Sault Ste. Marie for \$18.10 and rebuy, or pay cash fare, Sault Ste. Marie to Marquette, and save \$1.43. That would be true to all points on our line in Michigan, out to Montreal. The same condition exists on all business where fares make over St. Ignace.

Where the fare is made over the Soo it would be modified by the differential on account of the rule of the short line making the rate. It would, however, be the full cent a mile for all distances west of

Soo Jet.

This illustrates how, at two cents in Michigan, a passenger, Marquette to Milwaukee, where present fare is \$6.16, could save 11¢ by buying from Marquette to Negaunee \$.24 and Negaunee to Milwaukee, \$5.81, total \$6.05.

Newberry to Toledo, the present through fare is \$8.84 made up of Newberry to St. Ignace, 54.8 miles at 3¢. If local fare from Newberry to St. Ignace was reduced to two cents, it would be \$.55 less to

Toledo, passenger could buy twice and save \$.55.

601 St. Paul to Houghton, via C. St. P. M. & O. to Bibon, present fare is \$8.65, made up of our local from Bibon to Houghton, \$5.35, being 2¢ in Wisconsin and 3¢ in Michigan. St. Paul to Houghton, plus our proportion of the \$3.30 from St. Paul to Bibon, gives us less than 2¢ a mile for 72 miles, resulting in the rate per mile being reduced all along. That is because the business comes by a roundabout route. We still get 3¢ a mile in Michigan, but our

total revenue is less than our local rate. The difference arises out-

side Michigan.

In business to Copper Country from the east, via St. Ignace, we do not get our full local, it will probably average about $2\frac{1}{2}e$ a mile from the interstate rate. The amount varies, depending upon whether the rate makes over the Soo, St. Ignace, Chicago or Milwaukee; where it makes over St. Ignace, we get our local; where it makes over the Soo we get less than our local, though the amount is not a constant amount, it depends on the distance.

On tickets from Buffalo to Marquette, we get \$4 out of a haul of 155 miles. From New York we would get less, on account of the greater distance, the rate being but slightly higher than the fare from Buffalo, e. g., New York to Marquette, \$25.33, making over St. Ignace, we get \$4.20 for 155 miles—slightly higher revenue than on the ticket from Buffalo. This is made up of \$20.80, New York to St. Ignace, and \$4.53, St. Ignace to Marquette, our full local for 151 miles.

Montreal to Marquette, via Soo, we get our tariff fare of 602 \$4.53; our full local. New York to Marquette, via Soo, we would get \$4.20 out of a total of \$25.33; the fare is made up of \$20.80, New York to St. Ignace and \$4.53, St. Ignace to Marquette. The route via the straits makes the rate from New York City; if it comes via Soo, we get the same amount, being our full local from Soo Jet. plus a prorate per mile from Soo to Soo Jet. The fare from New York to Soo Jct. is divided-\$3.15, New York to Troy, for New York Central and the remainder on a prorate per mile, using 248 miles from Troy to Montreal, 625 miles from Montreal to Soo, and 46 miles, D. S. S. & A., Soo to Soo Jet. If the two cent law was put into effect in Michigan, I do not see very well how we could maintain the 3¢ fare from Soo Jet. to Marquette on interstate business, in view of the fact that the passenger could buy and re-buy. through rate would be greater than the sum of the locals, where that is true, a passenger can, if he knows it, and wants to, buy two tickets, instead of one, and save money.

Marquette to New York, via Soo, first class fare is \$23.61, we get \$3.09, being a mileage prorate after deducting arbitrary of \$3.15 from Troy to New York City, for the New York Central. This fare makes

over Milwaukee, east-bound, which is the short route.

Marquette to Lake Nebagamon, 227.3 miles the fare is \$6.00, made up of 3¢ for 147.9 miles in Michigan and 2¢ for 79.4 miles in Wisconsin. With the local fares in Michigan at 2¢, this would be \$1.47

less, I don't see how we could maintain a \$6.00 fare, as the passenger could buy to Thomaston; Thomaston to State Line is 13.6 miles; state line to Defer, first Wisconsin station, is 2.1 miles; Soo to Montreal, Mich. is 300.5 miles, \$8.90; Soo to Defer, \$8.95; under 2¢ fare from Soo to Montreal would be \$6.01. With 3¢ fares on interstate and 2¢ fares on intrastate, a passenger from Soo to Montreal would pay \$2.94 less than the passenger from Soo to Defer. Newberry to Superior 352.9 miles the fare is \$9.50, made up of 3¢ per mile for 244.4 miles in Michigan and 2¢ per mile for 109.2 in Wisconsin.

MANEY.

Cross-examination.

By Mr. Wykes:

The reason, generally, that I say 3ϕ could not be maintained for the interstate traffic, is the facility with which a passenger could buy a ticket over the territory in which he could pay 2ϕ , and thus get out of paying the 3ϕ that might be charged on interstate traffic, by breaking up his ticket purchases. In going from Marquette to a point in Wisconsin, he could buy at 2ϕ from Marquette to Thomaston, then up from Thomaston to Defer at 3ϕ .

There are now rates in Michigan upon which plaintiff gets less than 2¢ a mile. This is true as to certain local fares, and there is quite a little interstate business in which we get less than 2¢ a mile.

Duluth to New York City, second class fare, \$24.00, brings us 1.629¢ a mile, Duluth to Soo. It is divided on the prorate per mile via Montreal, after deducting \$3.15 for New York Central,

Troy to New York, 416 miles Duluth to Soo; 625 Soo to Montreal; 248 Montreal to Troy; that same ticket is sold at stations intermediate between St. Ignace and Duluth, at slightly reduced through force.

duced through fare.

Newberry to New York, second class is \$21.79. South Shore would get its tariff of \$1.64. From our main line stations, Marquette and west, the prorate per mile basis obtains; as you work east, the fare makes over the Soo, the same as Newberry fare did, not to exceed the fare from Marquette.

The business west of Marquette is based on the Chicago rate; except from Champion to Negaunee, the fares to New York are made over Milwaukee; Marquette being intermediate Negaunee to Soo,

would take the Negaunee fare.

The second class ticket is the kind sold in connection with steamship tickets. All steamship business is handled in that fare; the first class ticket from New York is about \$2.00 higher. The first class fare would be proportioned between the companies in the same manner. Duluth to New York City, second class is \$24.00; based on \$16.00 from Chicago, that figures 1.715¢ per mile. We would get a prorate per mile proportion of that fare after deducting the arbitrary, New York to Troy.

It would apply in that case from New York to Duluth. You go east on the line, take Marquette for instance, and you have another basis entirely, you get local in there from Soo Jct. to Marquette; this business comes to us via the Soo, we get that, plus a prorate per mile, Soo to Soo Jct., and that basis would apply to the big end of business

from eastern New York to Marquette.

We get our locals from Soo Jct. plus a prorate per mile from Soo to Soo Jct. For instance, we would get our local, Champion to Houghton, plus a prorate per mile up to Champion.

The mileage prorate division on the proceeds of those tickets would apply to all stations intermediate between Marquette and Seney, it is

understood that lines east of Soo are not to receive more than the

tariff fare, or their proportion of the tariff, from the Soo.

McMillan is about the point where we cease to get our local fare to or from Soo Jct. and begin to prorate the fares to points west on a mileage prorate, the reason is that we are making the rate via the Soo, starting from Champion.

We cannot charge a higher rate than we charge for Marquette, and we use the mileage prorate until the rate makes over the Soo. rates are always divided on the basis they are constructed upon, except in some cases there is an agreement for a different division.

On immigrant business, there is considerable on which there is a return of less than 3¢ per mile, and quite a little on which there is less than 2¢ per mile; on first class tickets, there is considerable business where the prorate per mile is applied, and the South Shore gets This condition applies to tickets sold on the around 2¢ per mile. South Shore to points in southern Michigan and Indiana, e. g. Houghton to Fort Wayne, the South Shore proportion is 2.28¢ per mile; Saxon to Fort Wayne, South Shore gets from Saxon to St. Ignace, for 308 miles, 1.8¢ per mile.

606 Defts.' Ex. 5, states generally, the method of division of passenger rates, in which part of the travel is on South Shore, between the participating companies. The business, where South Shore participated in the division on mileage prorate basis, in many cases yields under 2¢; I would venture to say that the majority was slightly in excess of 2¢. There is a varying rate from 3¢ down, dependent on the location of the station on South Shore. We have no trains handling exclusive interstate traffic, and none handling exclusive intrastate traffic; during summer season, we have two trains, 211 and 212, between Marquette and Michigamme, being Sunday excursion trains, which handle exclusive intrastate traffic.

Those are low fare excursion trains which charge fare of 50¢ round trip, Ishpeming to Marquette, as against regular fare of 88¢, and 75¢ Marquette to Michigamme, as against \$2,28 regular fare.

In trains stopping at a particular station, you let off interstate or intrastate passengers, or both. We have stops in Michigan scheduled for only passengers west of Wisconsin state line. None of our trains stop for purpose of taking on or of depositing a passenger of a particular character, interstate or intrastate, they stop to deposit them, promise-ously; they may be all of one kind or mixed.

None of our cars, including sleepers, run over C. P. R. Passengers all unload on American side at Soo; they there take through cars The business through Soo, east, is good at hauled by Soo line.

times of the year, but, as a general rule, it is very light: 607 particularly in winter; all our passenger traffic is lighter in winter.

We have no equipment going on to the C. & N. W. regularly; there is a C. & N. W. train operated from Chicago to Copper Country, of C. & N. W. cars; if passenger came out of Houghton at night, he would use our cars to Negaunee, and change to C. & N.W. there. The passenger from points east of Marquette going out of the state, south, would change cars at Marquette or Negaunee. The passenger from

between Wisconsin state line and Nestoria, going out of the state, south, would transfer to the through train at Nestoria, on afternoon service, or, on night train, would go through to Negaunee and trans-

fer there to C. & N. W. train.

There is no passenger service on the Bessemer branch 2.23 miles. On Republic branch, Houghton to Republic, the only passenger service is one train, No. 106, out of Republic en route to Marquette; that is C. M. & St. P. train, from Milwaukee, that runs through to Marquette, via Republic; it does not run over that branch on the return trip. That service has been in there about 10 years. There is no passenger service from Negaunee to Volunteer mine. On the spurs for traffic purposes—49 miles for 1910, 50 miles for 1911 and 62 miles for 1912—there is no passenger service.

Marquette to Winthrop Jct., 17.33 miles, no passenger trains use south track between Eagle Mill and Winthrop Jct. we have no passenger trains between Eagle Mill and Negaunee on south track, we have no passenger trains using south track from

Negaunee to Winthrop.

I have a statement, for October, 1912, giving revenue per train mile for various passenger trains; these are estimates. "Local fares" means tickets between points on our line. The figures are determined from ticket collections the are not the exact figures, but are not entirely arbitrary, being based on knowledge of part of the income. The ticket collections give an idea of what is being done, so far as the business is concerned. It is sufficiently accurate so I think I have a knowledge of the train income from the examination of these. These are reports made to me for information of the officers.

(Sheets produced and marked Defts.' Ex. 6, Maney for July, Ex.7 for October, and Ex. 8 for November, being reports of train earnings.)

West of Nestoria, on main line, called Western Division, our interstate business is the greatest. The intrastate business on that division is quite light, due to lack of population—the local business is very light. I cannot give the relations between the inter and intra business there. The inter business is much greater, in my opinion. In my judgment, July, due to through summer traffic, would show a larger amount of interstate business; the interstate passenger business predominates on the division east of Mar-

quette to Soo and St. Ignace. Marquette to Houghton is where we have what population we have. This is through Negaunee, Ishpeming, Champion and Michigamme. The testimony with rgard to the predominance of intrastate business on trains 1 and 2. St. Ignace to Houghton, would include both divisions.

On the Houghton Division, the intrastate business would predominate; there is considerable local travel there. The intra business might be close to twice the inter business on that division; if it is two to one for the whole state, it would be much more than that from Marquette to Houghton.

Mr. Wykes: That would necessarily be true, if he is right about the other two, that the inter predominates on the other two, because he would have to overcome all of that inter on this portion.

The relation of passenger miles was, 1910, intra 18 to inter 14; 1911, intrastate 19 to inter 13; 1912, intra 20 to inter 11. All our local excursion business is on the division, Marquette to Houghton.

We have to use the Houghton Division to overcome the interstate The Houghton Division is heaviest in both inter and intra traffic; the mileage is: Houghton Division, 95 miles including Republic Branch 112.5; Western Division, 101.5 miles; Mackinaw Division, 197.9 miles. The south track, Marquette to Negaunee, ought to go in Houghton Division.

I have stated the Houghton Division to be heaviest in both inter and intra business, taking the year through; next to the Houghton Division, the Mackinaw Division, east of Marquette, is the heaviest in interstate traffic; the Mackinaw Di-610

vision also comes second to the Houghton Division in intrastate traffic; that is much heavier than the Western Division.

In my opinion, train 7 handles more interstate than intrastate business, comparing it with the rest of the trains. On 7 and 8, the inter business is also heaviest, and that is based on the fact that the trains have very few stops and are run to cater to long-haul traffic.

When in my testimony I stated that a certain train was the average, or above or below, I meant there was an average income of \$1.19 per train mile, and classified trains as falling below or above

that amount in earnings.

When I stated that the intrastate business predominated on trains 7 and 8, I had in mind the volume of business during the summer months, out of the Soo, but other considerations lead me to assume that the bigger portion is interstate business. An exact determination could not be made. There are now three lines between Eagle Mills and Negaunee.

(Defts.' Ex. No. 5, Maney, being method of division of rates between participating companies, introduced by plaintiff.)

MANEY.

Redirect examination.

By Mr. Butler:

My testimony as to the relative amount of interstate and intrastate business on trains was based upon general familiarity with movement of traffic; I have no figures, calculations or 611 accounts to support it; this is also true as to the comparisons made with regard to the relative density of the traffic of different characters on different divisions. I have nothing to do with operation, and there is no reason why I should be more familiar with the tracks operated than any person occasionally over the road.

MANEY.

Recross-examination.

By Mr. Wykes:

July and December or January and July would be fair months for determining the density of traffic.

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On February 19, 1913.

CHESTER J. McPherson, a witness called by Plaintiff.

Direct examination.

By Mr. Butler:

I have spent upwards of 30 years in operating department of rail-road service. I entered railway service as Telegraph operator at 16 years; later was station agent, train dispatcher, chief clerk to superintendent; general yard master, chief dispatcher, chief clerk to general superintendent and master of transportation, with Terre Haute and Peoria, a part of Pennsylvania system. For 20 years I was with Illinois Central and Missouri Pacific; for past seven years as assistant to general manager of latter. I have given much attention to matters affecting cost of railway operation and expense incurred in different classes, and to railway economics, which necessitated inquiry of all lines of operation. For 20 years I have sought to get a check on railway efficiency, checking various units of operating department, by divisions; I have traveled all the lines of inquiry, seeking truth as to costs.

For Missouri Pacific I prepared formula for operating costs, seeking unit costs in all departments. I was a witness in Arkansas and Missouri rate cases, in which Missouri Pacific was involved, and, as representative of that company, I assisted in preparing the formula on which division between states was made. In both cases, the question of reasonableness of state-made freight and passenger rates was involved. I was also an expert witness in Minnesota Rate

rates was involved. I was also an expert witness in Minnesota Rate
Case (for N. P. & G. N.), involving freight and passenger
rates, and in Chicago, Peoria & St. Louis case, recently decided, involving Illinois 2¢ passenger rate.

I have examined Complt.'s Exhibits Nos. 1 to 49 in this case. I have become familiar with operating conditions on South Shore, by going over all parts of the road in Michigan, except Republic branch

I have examined exhibits in this case dividing expenses between states, and Michigan proportion between freight and passenger. Complt.'s Ex. 41 Delf (method of division of operating expenses between states, and Michigan proportion between passenger and freight), is the method generally used. Because of a simple situation, it is closer, as to amount allocated, than has been reached in other cases I have examined; one difference exists; e. g., some rail-

roads have used gross revenue basis to divide general expenses between states; whether that is any closer is a question in my mind.

The method of Complt.'s Ex. 41, Delf, is very close to, and does not differ materially from, that followed in any other case, where same issues are involved. Portions of three maintenance of way expense items, roadway tools and supplies, stationery and printing, and other expenses, not allocated between states, are occasionally divided on track mileage basis, the amounts represented being small.

In instances in which track mileage basis is used for division of unallocated expense items between states, I know of no 614 other basis or factors that would as nearly reach the truth,

and that is a fair and proper basis.

(Witness approves division of 96% maintenance of telegraph and telephone lines between states on total miles of wire in each state.) (He also approves various divisions of unallocated expense items between states upon basis of Complt.'s Ex. 41, Delf, as follows:)

Maintenance of equipment:

Superintendence.

Steam Locomotives—Repairs.
Steam Locomotives—Depreciation.

(Divided on revenue locomotive mile basis. A division might be made on train miles, which would be relatively the same.) Passenger Train Cars—Repairs.
Passenger Train Cars—Depreciation.

(On basis of passenger car miles.)

Freight Train Cars—Repairs.
Freight Train Cars—Renewals.
Freight Train Cars—Depreciation.

(On freight car mileage.) Shop Machinery & Tools.

(On basis of revenue train miles.)

Each State Charged with Injuries Occurring therein. Stationery and Printing.
(On basis of Revenue Train Miles.)

Traffic expenses:

Superintendence. Outside Agencies.

(Allocated between passenger and freight, and divided between states on appropriate train mileage.) Advertising.

Traffic Associations.

(Separate freight and passenger items on appropriate train mileage, and joint items on revenue train mileage basis.) 615 Fast Freight Lines.

(On freight train miles.)

Stationery & Printing.

(Separate items on appropriate train mileage, and joint items on revenue train mileage basis.)

Transportation expenses:

Superintendence.

(On revenue train mileage.)

Dispatching Trains.

(On revenue train mileage basis.)

In dispatching trains the train is the thing dispatched; this is whether the passengers be 1 or 100; the train is the unit.

There would be the same amount of work to dispatch a train as a locomotive.

Weighing and Car Service.
(On freight train miles.)

Station Supplies and Expenses.

(On ratio of station employes' account.)

Road Enginemen. Enginehouse Expenses.

(On locomotive miles.)
Fuel for Locomotives.

(On locomotive miles of each class of service.)

Water for Road Locomotives. Lubricants for Road Locomotives.

Other Supplies for Road Locomotives.

(On ratio of fuel for road locomotives.)

Road Trainmen.

Train Supplies and Expenses.

(On basis of revenue train mileage.)

Stationery and Printing.

Other Expenses.

(On basis of revenue train mileage.)

Loss and Damage—Freight. (Freight train basis.)

616 General expenses:

Principally divided on revenue train-mileage basis. Insurance and Equipment.

(On basis of mileage of each class of equipment.)

Referring to Complt.'s Ex. 41, Delf, division between passenger and freight I approve the use of revenue train mile basis for dividing common or unallocated items of expense between the passenger and freight services, giving as reasons:

(a) That there is no other basis I consider of value, after much thought and having tested it, or that could be used, and arrive at

anywhere near a correct division.

(b) Apart from the fact that much of the expense of maintenance of way and structure does not occur from use, the expense due to use

arises from train miles in freight and passenger service.

(c) The train miles are the causes for the expense of use; the track must be maintained to a standard that will give efficiency and service, both freight and passenger, and for that reason the division would naturally follow the use or cause of the expenses.

(d) All there is to a railroad, after all, is the operation of its trains; it all simmers down to train operation; that is all that brings in revenue.

(e) I believe it the proper and only factor for maintenance of way and unallocated expense in maintenance of equipment and

traffic.

617 (f) This brings up question of relative cost of passenger and freight train mile; it is true that they are different; the passenger train mile is made at an authorized speed of double the

freight train speed.

D. S. S. & A. time table No. 299, Western Division, effective Jan. 5, 1913, prescribes maximum speed of freight trains as 3 minutes per mile and passenger 13/4 minutes per mile, running time, taking water, irregular stops, etc., not included. Houghton Division time table No. 228 (Complt.'s Ex. 63), effective Jan. 5, 1913, maximum speed of freight train, 3 minutes per mile; passenger, 1.5 minutes per mile. Mackinaw Division time table 221, effective June 30, 1912, maximum speed of freight trains, 3 minutes per mile; passen-

ger, 1.5 minutes per mile.

Considering only that passenger train miles are made at higher speed than freight train miles, with a heavier train, there would be such a difference that one would hesitate to use train miles as a factor in dividing common expenses, but, to one acquainted with practical operation, it is possible to go further than those two factors, and see whether one service imposes limitation on the other, and whether those are sufficient of themselves to equalize practically the expense of the two classes of train miles, as the best factor for dividing expenses that cannot be definitely ascertained; the division would not be exact, but it would be nearer the truth than any other I know

618 Construction and maintenance must be such as to meet the maximum service; there is much curvature on nearly every railroad, which must provide an elevation for the maximum speed of trains, and a little wider guage to prevent binding and overcome centrifugal force. This imposes a limitation on the freight trains which would not require that elevation with a maximum speed of 20 miles an hour; the result is greater wear of freight trains on the track, an element to be considered in equalizing between the two classes of miles.

The passenger train service is preferred; the freight train must take the side track. This causes an expense imposed upon freight service by passenger service, both of transportation and maintenance; the freight train takes the side track to meet and to let passenger trains in the same direction pass it; it must stop, the switch be opened, and pull ahead on to the track, and stop again. After the passenger train has passed the freight pulls out of the sidetrack slowly, to allow the trainmen to set the switch and get on the train; so that causes two stops and starts to that train, which are an element of expense.

In maintenance of way expense, there is the wear on switch points and frogs, due to use by freight trains, but necessitated by passenger trains. While the train is on the side track 25, 30 or 50 minutes, it has been using coal, water and other supplies, which, while charged to

freight, is due to passenger train.

The only element of a train exerting tractive force is the locomotive, and the larger wear of tracks on a tangent is caused by locomotive. On curves, more or less wear is due to car wheels, due to the fact that guage is wider and outer rail is elevated. Freight trains have greatest number of wheels to cause wear on such curves, but that is incident of passenger trains, freight trains don't require the refinement of track to meet high speed service, but must take the consequences of it, which makes their wear and tear greater than if the railroad were built expressly for freight service.

This basis does not reach the division of expense exactly; railway companies, for their own purposes, have adopted the factor of train miles to test their own efficiency of operation; if there were a better

unit, they would use it.

A large part of maintenance cost is due to other causes than use; what would divide the cost we know is incident to the train should be employed to divide cost that cannot be allocated to other causes. The reason is there is no way to measure it in units of operation, but it is an expense that must be paid; the best measure, in our judgment, for dividing expenses caused by trains would naturally be the basis to use for the entire.

(The witness gives items where repairs and renewals are not due to wear of train movement; of removal of sand, snow and ice, reve-

nue train mile, basis charges as much to freight as to passenger; if anything, passenger should bear more than is charged to it of bridges, trestles and culverts. Certain of the items are hardly affected by wear; so, also of telegraph and telephone lines. Stationery and printing would not be affected by train service; of

ties, wooden bridge stringers etc., expenses are due to both causes. The extent of increased wear by freight trains, due to refinement of construction and adjustment in track necessary for passenger service,

cannot be reached with certainty.

My idea is that expenses incident to stopping and delaying freight trains are properly chargeable to passenger business. I have made a study of time table and operating sheet of South Shore, to make a chart illustrating the necessity of such stops on that road if the trains moved on schedule, and have participated in making such a chart. The chart (Complt.'s Ex. 62, McPherson) is for Houghton Division, and shows both the normal movement per schedule and the actual movement, or time such train passed a station; I used time table previously referred to (Complt.'s Ex. 63) to take effect Jan. 5, 1913; the time table shows the movement of trains as planned for comparison of the movements as they appear to have occurred by the train sheet (Complt.'s Ex. 61 McPherson).

In operation of passenger trains, a greater length of track is reserved for their exclusive use than for a freight train moving in same direction, as a passenger train runs twice as fast. This means a

passenger train must be given between 25 to 30 miles use of track; anything less gives a chance for interference to delay passenger trains. They move a freight train just as far as

they safely can against a passenger train and enable it to get on a side track out of the way. I don't mean freight trains are to be 30 miles out of the way of passenger trains, but I say that, if they are coming together, that is the amount of track behind the passenger not being used and between it and the freight not being used. The passenger train, having run so much faster than the freight train, has left a considerable distance between the last freight and itself. The freight train would have only what she could accomplish and keep off the passenger train's time, or was helped by the train dispatcher; I don't believe I could express that in actual figures; this testimony all refers to single track operation.

The passenger train service is preferred, having first call on the railroad organization: I have heard men of experience and good judgment express the opinion that passenger business on any single track

railroad is a losing business.

The company's material of freight is carried almost wholly on freight trains, the expense of which is in freight account. On certain railroads, investigation indicated that one and one-half to two tons per car, or about 2% to 2.5% of the freight ton miles, are company freight. The percentage would vary on different roads, due to the tonnage of revenue freight traffic, and the need for material and fuel;

it would be a substantial item, but I know nothing of local conditions on D. S. S. & A. Other things being equal, the smaller the amount of revenue business, the higher the per-

centage, to revenue, of the company's freight would be.

My answers as to the propriety of the revenue train mile basis of division of expense was intended to cover its use wherever employed in Complt.'s Ex. 41 Delf; I believe it the best, and, while not perfect, the only largely reflective basis.

I also approve other bases for the division of certain items between freight and passenger, as used in Complt.'s Ex. 41 Delf, as

follows:

Maintenance of equipment:

Superintendence.

(On Michigan revenue locomotive miles.)

Station Employes.

(On revenue train miles.) Station Supplies and Expenses. (On ration of station employes.)

Transportation expenses:

Yard Expenses (12 items).

(Divided 10% to passenger and 90% to freight; this is largely a local question, requiring observation of the work done by switch engines; all roads make that division in an arbitrary way; the percentage arrived at by observation of the operating and accounting man; I have no familiarity with South Shore situation, but approve the method.)

Water for Road Locomotives. Lubricants for Road Locomotives. Other Supplies for Road Locomotives.

(On same basis as fuel for Road Locomotives which is allocated

between passenger and freight.)

These divisions between freight and passenger, through use of revenue train mileage, are not a matter of accounts, nor kept by the railroad as accounts. It would be impossible for the railroad to make a division in its books between freight and passenger; there is no necessity in the railroad's operation to do that, so we must go to a matter of statistics for which this division has been used many years.

The Interstate Commerce Commission before 1894 demanded such a division on an arbitrary basis. That was wrong, it could not be done on that kind of a basis, because the question was one of determi-

nation on different bases; that was abandoned 20 years ago.

So far as I know, the division by railroads is substantially as given here; in fact, it was adopted by both sides, with no contention, in the Missouri Rate Case; there, the source of contention was

between interstate and intrastate in freight and passenger.

Substantially, the train mile basis was used as indicated in Complt.'s Ex. 41, without enough variation among all the railroads to be material. Among operating men, there is a concensus of opinion that the factor for the division between freight and passenger as here used is the best known factor. Complt.'s Ex. 61, 62 and 63, McPherson, introduced.)

I do not intend to indicate by Complt.'s Ex. 61 McPherson or claim, that all the delay indicated by the chart was made necessary by meeting freight trains; there are a good many

that are due to the passenger trains, and a good many that are uncertain. There are a good many of these delays by freight trains that a man, reading the chart and familiar with train operations, is certain are caused by waiting for passenger trains, but he would not want to testify to it as an actual fact.

A man who has been a train dispatcher, looking over Complt.'s Ex. 62, would come pretty near figuring out the delay caused by waiting for passenger trains, but could not tell how much of it was due to the waiting and how much due to station work, without examining the train sheet and seeing that the train had its maximum

number of cars and had no work to do at that station.

(Complt.'s Ex. 43, Delf.) The Michigan passenger operating expense will be divided between interstate and intrastate on the basis of the earnings of each, with an addition to the intrastate business, to represent the greater cost of handling intrastate passenger over the interstate; this is the revenue basis equated. There is a sufficient data on Complt.'s Ex. 43, Delf, on which to base an opinion, and I have formed one—that it costs approximately a minimum of 25% more to produce an intrastate passenger mile than an interstate passenger mile. This opinion is based upon the following:

(a) Average journey of intrastate passenger, 1910, was 31 plus miles, while, for interstate it was 143 plus miles.

625 (b) Substantially 4.5 different people, on the average, travel over the line in Michigan to produce the same number of intrastate miles as one passenger in Michigan 143 miles.

(c) This means a greater use of terminal facilities by intrastate

passengers.

(d) Intrastate passengers both board and leave the trains in the state, and, in the ratio of 41/2 to 1, there would be a ratio in use

of terminals of 10 to 1.

The excessive use of terminals requires additional selling of tickets, loading, unloading, checking and putting baggage on and off trains, use of terminal facilities, etc., terminal facilities means, at each station, wages of employees, maintenance of stations and platforms, cleaning, heating, lighting, supplies, ice and water, etc., which make up a large part of the expense of passenger operation.

The number of persons travelling were, in 1910, intrastate 488,-745, or 85% and interstate, 100,748, or 15%. Doubling terminals for intrastate makes intrastate 92% and interstate 8%, which indi-

cates the actual physical use of terminals.

Table by Delf (Complt.'s Ex. 64, McPherson), shows interstate

and intrastate tickets sold for the year ending June 30, 1912.

This shows, for local tickets sold in Michigan, 98% intrastate; for coupon tickets, 75% intrastate; combined local and coupon tickets sold, 94% intrastate.

626 Each intrastate passenger would use terminal twice and interstate passenger once, making relation of 92 intrastate

to 8 interstate, or 11 to 1.

Table by Delf (Complt.'s Ex. 65, McPherson), of ticket sales for year 1911 shows, for local tickets sold in Michigan, intrastate 98%, coupon intrastate 75.5%, local and coupon combined 94% intrastate.

Risk of injury in boarding and leaving trains would be 92% intrastate and 8% interstate for 1910, and risk of train accidents 85% intrastate to 15% interstate (the latter obviously wrong and later corrected, and still wrong.)

The risk of train accidents would probably depend upon distance traveled, and be as 4 intrastate to 1 interstate.

I have examined annual reports of D. S. S. & A. to Railroad Commission of Michigan for 1910, 1911 and 1912; they show, for passenger trains:

Year. 1910 1911 1912	4 49	Average passengers per car. 13 13 13	Average passen- gers per train mile. 42 43 43
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This shows three passenger cars per train on an average. seating capacity of these cars (allowing 15 for cafe observation cars) would be 123 people, while only 42 used them, on the average, showing an additional car over the average use; this becomes necessary

to provide accommodations for maximum number of passengers at any point between terminals. On account of uncertainty of short haul business, 25% of the expense of that train is due to provision for intrastate business; that would not apply to interstate.

I do not say it would apply to entire cost, as no more train employees would be required; there should be assigned to it 25% of the haulage cost and 25% of the cost of maintenance of equipment of the train and depreciation, and of the maintenance of way assigned to that train as between the cars. It would be hard to give an exact figure for it, or to estimate, as it is not possible to separate the costs common to all the cars of the train. There is no known way of keeping the cost of interstate passenger business separate from the cost of other business, by accounting; the assignment of costs between interstate and intrastate is, at best, an approximation.

But there is a certain amount of synthesis in it, because of factors greater in one case than the other, as (a) length of haul, (b) additional equipment, and (c) greater number of stops for intrastate

passenger than for interstate.

Train	Route.	Mileage of route.	No. of stops.	Average miles between stops.
	Houghton to St. Ignace	245	59	4.17
2	St. Ignace to Houghton		57	4.31
3	Marquette to Houghton	94.5	17 18	$\substack{5.56 \\ 5.25}$
4	Houghton to Marquette Nestoria to Duluth		32	3.09
6	Duluth to Nestoria		32	3.09
7	Duluth to Soo	. 302	22	3.75
8	Soo to Duluth	. "	21	14.41

This is mileage in Michigan and this train is interstate carrying also local business.

In some instances, the excess cost would be above 25%; in 628 some it would go below; I take it that that would be the aver-The average is at least 25%. I do not recall having used the word minimum before; if I did it was not intentional. In my judgment, the excess cost would not fall below that average. I think the cost due to stops of passenger trains at stations should be divided on the number of passengers; of course, each stop would take care of any number that wanted to get on or off. I should say that the ratio would be about ten intrastate to one interstate, taking the average If the company were doing simply interstate busilength of haul. ness, the average stops required would be at 143 mile intervals; while doing intrastate in connection with it, they would stop every 31 miles. Both terminal expenses—taking and leaving trains—should be taken into consideration with intrastate passenger. (Complt.'s Ex. 44, Delf, freight statistics) Leaving out of consideration the ore business, the elements upon which an opinion of the relative cost per ton mile of the intrastate and interstate freight business in Michigan, in each class, must be formed in this case, in the absence of division of less than car loads, would be the length of haul. The intrastate freight business moved an average distance of 62.35 miles, while the interstate moved an average of 108.28 miles; there was a greater cost in producing a ton mile of intrastate than of interstate freight, due to the greater use of terminals and equipment; two terminals are at-

tached to intrastate and one to interstate business, as a general proposition—108.28 miles with one terminal expense, as against 62.35 miles with two terminal expenses required for intrastate business; two cars as against one car for interstate business. It is axiomatic that the cost per mile, as applied to ton miles, decreases as the length of haul increases. This is on both carload business and less than carload business; two cars being required for the same amount of intrastate business would require double the capital, the depreciation, switching and station employe service of billing, abstracting and handling accounts.

The basis for the conclusion that two cars are necessary for intrastate business to one for interstate is purely on the length of haul; interstate haul averages 108.28 miles; intrastate averages 62.35 miles. After you have gone to the expense of making your 62.35 mile shipment, before you have attained the same number of ton miles, it would be necessary to make another interstate shipment of 46 miles,

and each shipment would have a terminal at each end.

Shippers are allowed to use the cars at either end of the shipment for 48 hours; to produce 108.28 miles, therefore, in the intrastate business, eight days have been lost in the use of the car, in time consumed in transporting it between the points, as against two days' use lost for interstate shipment in Michigan; the relation is four to one in the investment in and use and depreciation of, cars.

As to switching, there would be six switching movements in Michigan in the intrastate shipment and one in interstate; the 630 hauling of the cars, if tonnage were equal and class the same, would be of equal expense, per ton per mile, in interstate and intrastate; I should say that it cost twice as much per ton mile, on an average, in the intrastate business as it does in the interstate business; I apply that to all stationary and rolling expense attached to transportation.

Applying to the total expense, including general expenses, based upon the rate per ton mile, it would cost double the amount to produce the intrastate ton mile over the interstate, embracing all ex-

penses that would attach to freight cost.

The General Managers Association has made a tabulation of the gross earnings made by freight cars per day throughout the country; it is in excess of \$3 per car per day, while the company gets \$1 for demurrage. The illustrations given indicating extra cost of intrastate over interstate business, are confined entirely to carload business.

The less than carload business is the most expensive business that a railroad company handles. In cost of less than car load freight, as between state and interstate, the average haul enters as a very important factor, due to light loading of cars; there is always a much larger average haul on interstate than on intrastate, and the use of

the equipment would multiply in relation to length of haul; if the haul were 100 miles interstate and 25 miles intrastate, there would be four times the use of equipment to make the intrastate ton miles

that there would be in the interstate ton miles.

631 In the matter of cars, the same relation would exist, as explained in the carload freight. Generally speaking, the cost of handling intrastate L. C. L. business is at least five times as great as intrastate. I put the maximum as five times as great, it may be eight times; the more I analyze this question the more I have become confident that our opinions have been too low on this extra cost.

McPherson.

Cross-examination.

By Mr. Wykes:

I assume the L. C. L. business was equally divided as between intrastate and interstate; in the figures given, no division between carload and less than carload was given. I took the entire tonnage on the assumption that there was an equality between the L. C. L., and assumed in my answer, based on the length of haul, that the carload

business alone was two intrastate to one interstate.

There was nothing whatever from which I could separate the amount of carload and L. C. L. business; my percentages would apply with regard to conditions as they actually existed (for that cannot be separated), unless it developed that there was a greater difference in the length of haul between less than carload that there was between the total. I have assumed the same length of haul in both cases. Where the freight is L. C. L., both classes would be carried in the same train, and probably in the same car; I am not prepared

to say what the loading—the proportions—of interstate and intrastate in any particular train or class of trains would be.

With L. C. L. interstate and intrastate in the same train, a car of intrastate would be unloaded and peddled out as you went along, while the interstate would probably be retained in the car for another haul.

There is a possibility that a particular train might have interstate freight for all stations along the line. The car might go from Duluth to Marquette, containing interstate freight only to Marquette or stations west; when part of the interstate freight is unloaded, for the purpose of economy of operation intrastate freight might be loaded into the same car, that is, the car would be utilized as far as it could be.

The density of class freight is not as great as of carload freight; this is equalized more or less in the class rates, and for smaller freight there is a considerably higher rate than for carload ship-

ments.

The rates fluctuate somewhat with the length of haul on less than carload business—the shorter the haul, the higher the rate, as will be observed from the distance tariff.

Q. And so, before you can determine whether there is a profit on

a particular class of business, you must compare the cost of hauling

business, must you not?

A. You couldn't determine that, prehaps, individually, only in a general way, but, taking the class and the average length of haul. you wouldn't determine the exact cost, but you would determine a relative cost between that and the commodity.

633 Q. But even then, to determine it relatively by classes, involves, an examination of both sides, that is, the rate and the

cost, or the revenue and the cost?

- A. The exact cost cannot well be determined, we can only approximate that, that is a matter of judgment. The unit cost of carrying freight on a railroad cannot be reached; we can get an average cost per ton per mile by reducing it to ton miles and then applying observation of the work or efforts necessary, the way it is handled, the bulk, etc., by an addition to the ton mile, would be able to reach somewhere near an approximation, possibly. We tried to do that, but it is not exact.
- Q. So I understand you to say that it is not possible to get at exact costs for particular commodities or particular shipments?

A. No.

Q. Nor is it possible to get at exact costs for particular classes, even there it is an approximation, but when you have approximated the cost for a particular class, to find out whether that particular business is profitable, you must compare the revenue from that particular business with the cost for that particular business, as you reached it by approximation, is that true or not?

A. That would, of course, be necessary, to bring in the revenue, to determine whether or not it was profitable, but the labor of 634 ascertaining the cost of any one class compared with another class, by investigation, would be prohibitive, and after you had secured it in one instance, you might find a different condition

that you would vary that very much.

Q. When I spoke latterly of the class, I meant the class as between inter and intra, and even there you must reach it by methods of approximation?

A. Certainly, you must reach it by those elements I spoke of this

morning, that is, the length of haul.

Q. And the more familiar you are with the operation, the character of the traffic and the particular difficulties the railroad has to contend with, the closer you may get your approximation?

A. The more you are familiar with those conditions, yes.

My idea was that the car costing \$900, with annual maintenance of \$65, would earn \$3 per day gross, on an average; the \$1 demurrage is not compensatory. The \$3 is determined by dividing freight revenue by the number of cars.

My cost of two to one in intrastate over interstate was based on two terminals for intra and one for inter and on the relative length of haul, there would be four terminals for the same length of haul on

the intra and one on the inter.

There might be exceptions to that general rule; I gave no weight to, and did not take into consideration, the exceptions, their volume,

or what they were, because even if a car is handled twice, it would be rarely the case that the second terminal on an interstate shipment would equal either one, the originating and the destination

635 terminal, there might be some expense attending an intermediate station. I am basing it on the general proposition that an interstate shipment has but one terminal within the state.

To equal the 108.28 mile haulage of interstate in the intrastate, there would be one shipment of 62.35 miles and another of 46 miles, each involving two terminals; the 46 miles would be necessary to reach the average length of interstate haul.

The character of the terminal—whether at the Soo or at Nestoria—and the cost of the terminal would make no difference in the actual cost of handling the car through them; the process of handling the car at the Soo is precisely the process of handling at Nestoria, so the

cost might be very closely the same in the two cases.

The value of the property on which the work was done might be greater and undoubtedly would be greater, at the Soo than at Nestoria; the value of the use of the terminal would not be any greater, because we get the same service out of each, the use, as measured by expenses, would be exactly the same. If you were going to determine the value of the use, you would have to go into revenue; you could not determine the value of the use by your expense, you would not get a solution to your problem of value.

If you were fixing a rental for these two terminals, the rental at the Soo would be much larger than at Nestoria, because you were dealing in values; I didn't make any examination to determine what proportion of the interstate business has more than

one terminal in Michigan, that would be a local condition.

I can imagine intrastate shipments on which there would be only one terminal; I made no examination to determine the volume of interstate business having two terminals; that would be exceptional, though it might be true. As against interstate business having two terminals, there is much interstate business with no terminal expense in Michigan, e. g., business from Copper County on Copper Range and Mineral Range, beyond Houghton, to Chicago, by C. & N. W., there would be no terminal expense attending that. Terminal expense for those shipments would appear in accounts of Mineral Range, Copper Range and C. & N. W.

The basic consideration of difference between cost in intrastate and interstate freight business is the length of haul, involving the greater use of terminals and cars and greater amount of switching; the switching item in freight business is a very large item of cost. The switching cars into and out of industries may involve distances of miles, which would be additioual cost; distance would cut little figure

in the natural breaking up of cars—in yard work.

My testimony throughout was exclusive of the ore business, and I don't intend to embrace that in any of my figures.

In passenger business, I made no investigation to determine amount of interstate business having two terminals in Michigan, but testified on the assumption that interstate business had one and intra-state two, here, also, you have your trans-state passenger

business with no terminal on South Shore—Passengers from Calumet to Chicago, or from Canada to Duluth, would have no terminal service on South Shore.

Q. Would that be true if they transferred at the Soo station; would

you say there wouldn'- be a terminal charge?

A. There might not be a full terminal service; that is, the agent wouldn't be called on to sell tickets or to check the baggage; a man might have bought his ticket in Toronto or Montreal, Canada, and his baggage would be checked through to his destination, but there would be the physical necessity of handling his baggage,

Q. And also transferring him and getting the car ready to put him

at that terminal?

A. Yes, providing the facilities for transporting him.

The Master: You wouldn't call a change of cars at a transfer a terminal service?

A. Well, I don't know, you might denominate it as a terminal service, it probably would be as much a terminal service as a man alighting from a train and having his baggage put off, except that there

would be a difference in accounting, expense, there would be no accounting expense at all at the Soo, while there would be an accounting expense with a passenger alighting with his bag-

gage at his destination.

The percentage of passengers checking baggage is comparatively small, and depends a good deal on the season of the year. I have found that the greatest checking of baggage has been in the intrastate as a rule. Traveling men carry baggage, having it checked from station to station; the number of terminal services they get is enormous—short distances. I have made no investigation to determine the ratio on South Shore; I simply assumed commercial conditions did not vary much in different parts of the country.

As between the interstate passengers themselves, there would probably be a bigger proportion than of intrastate who would have baggage, but the intrastate passengers are so dominating in number that when a few of them check baggage it is still of greater quantity. On the proportion of passengers, the intrastate would run less than the interstate on the basis of passenger miles, it might work out that there was a larger proportion of interstate; i. e., the distance hauled, as represented by miles, might be greater in the interstate business, but the baggage would not have as many terminal services. There is a possibility, of interstate and intrastate passengers for each station; I presume you could find stations on every railroad in the country at which there would not be an interstate passenger in

a year. If they are going to go on a long journey, they/
639 probably would make their arrangements to go to some large
town where they would get full information and start the
journey from there, and even then there are relatively few people
that make interstate journeys in proportion to the intrastate.

With everybody, an interstate journey a few years ago was an undertaking; today, it is rendered comparatively easy by the conveniences afforded by the railroads, and still there are stations that I know if, on the roads with which I have been connected, where,

during my connection with them and intimate acquaintance with the villages, there probably wasn't an interstate journey made; they had cities of good size in the state, and that is where they visited.

It costs no more to stop to let off ten passengers than one, except

the length of time necessary to unload extra people.

In reaching additional cost for intrastate passenger, there are some items of additional cost not amounting to 25%, and others which I am satisfied amount to many times that. Viewed ralatively, if a train stopped for ten passengers, nine of whom were intrastate and one interstate, 90% of the cott of that stop is properly chargeable against the intrastate business; I don't say that it would actually increase the expense though.

If we were going to refine the question by close analysis, the

relation in that cost would be nine to one.

Now, so far as the railroad company is concerned, it is not a penny either way in difference in the cost of the stop, but if the cost of the stop, say, instead of a dollar, probably would amount to two or three, and you are going to analyze that, the division of it as between state and interstate, why, it would be in proportion to the number of people accom-odated. The intrastate

would get nine times the benefit of the interstate.

The primary difference in cost in the freight department is dependent upon the length of haul; this is also true in the passenger department, bringing about the conditions I have enumerated. There are other very important elements. The greater number of passengers traveling in one service than in the other produces a cost of more cars to handle, greater use of station platforms, waiting rooms, facilities and expense of hauling, lighting, cleaning, supplies and employees; the figures show 85% intrastate and 15% interstate using the stations, and the number buying tickets from the agent, 94% intra and 6% inter; the other interstate passengers represented people who came on to the line with tickets purchased elsewhere.

At a one man station, it would be necessary to have the agent there for either class of passengers; but, if it were not for the local passenger, you might not need any, because of the interstate travel not being so general; every station has intrastate travel, but few of them have interstate passengers, and others only on rare occasions. If you only

had interstate passengers, you would have far fewer stations
641 and the necessity for less property. If there were the same
number of people and the same length of haul in each class,
the only question would be as one terminal to two.

The reason the ticket sales, shown on Complt.'s Exhibits 64 and 65 are not nearer to the aggregate of the number of passengers carried,

is the cash fares and mileage.

In my excess cost of 25%, I regard the possibility to exposure to accident as of the greatest importance, that, even on the South Shore, may sometimes cost as much as all your fuel costs in a year; it is among the possibilities—among the risks you take. I divided that into two kinds, possibility of accident in loading and unloading and of train accidents in transportation, the latter being ten intra and one interstate. This was due to dealing with the average length of

haul; a passenger always is exposed to accident. Every man around

railroads is exposed; e. g., an engine might explode.

Q. Another one takes his place, and he is subject to accident for the 31 miles that he travels, but he is substituted for the other man, another one takes it for 31 miles, and he is subject to accident for the time that he is on the train, so, instead of being ten to one, isn't it in the exact ratio that the number of miles in the intra bears to the number of miles in the inter?

A. No, I used this illustration merely to show that it took four and a half passengers to make the length of haul of one interstate passenger, but that did not mean that there was only one interstate passenger and one intrastate passenger on there at a time.

You have got 40 or 50, whatever the relation of the travel is on that train. We are dealing with that average merely to be fair, and not put it on the basis of the 85% intrastate and 15 interstate, we are putting it on the average length of the haul, as the lowest possible way it could be, about four and a half to one, we will have say ten interstate passengers on that train at the time it is wrecked, now, then, you have in your intrastate passenger, relation of four and a half intrastate to one interstate passenger exposed to injury from the derailment or collision, or whatever the character of the accident may be.

Q. For a limited time, for 31 miles, you would have your 45 passengers exposed, but you would have your ten passengers exposed four times and a half as long, because they are on the train four times and

a half as long?

A. But the relation is the same, if you are going to get the same passenger miles. Passenger miles—I beg your pardon, if you are going to get your business, you can have as many times the people traveling that 31 miles as you have got passengers; you have got a relation of your passengers of 85% intrastate to 15% interstate, now, in numbers of people traveling, that is about six to one, isn't it? Your interstate passenger is exposed the whole 143 miles, but you have got the equivalent of that 143 miles exposed for every mile—in intrastate passengers for every mile that the interstate passenger is ex-

posed.

That ten to one is based on the relation of the interstate haul to the intrastate haul, or, putting it the other way, the relation of the intrastate haul to the interstate haul, and that was an average. Now, in dealing with the actual condition of these intrastate trips, being made up of two, three, four and five miles, it wouldn't apply exactly to the exposure to accidents; if you were going to put it on that basis, it would be greater than four to one—it would be six to one, now, in the exposure to train accidents, I said four and a half to one, not ten to one, the ten to one was the exposure to accidents from boarding and leaving trains; the exposure to train accidents was four and a half to one.

The addition of an extra car, or 25% more equipment, to meet maximum requirement of intrastate business, would not increase all expenses in that ratio; it would the cost of car cleaning and switching.

but there would be no extra employees.

The fuel cost should be equitably distributed between the load back of engine, the fuel cost would be a little more with another car added. There is no way I know of to measure the cost of this extra car, other than to divide the fuel cost equally between cars for weight behind engine. The maintenance for car wear on track would increase in the ratio of number of cars; that would be one-fourth the wear, naturally. The wear to rail by cars is slight in proportion to that of the engine. A knowledge of local conditions on South Shore might indicate additional extra costs for intrastate passenger business. My

testimony applies to conditions common to all railroads. My direct examination related to operating costs, except the requirement of a greater number of cars increasing the value of the property employed, upon which a return should be allowed, at-

tributable to the freight business.

Other things being equal, density of traffic produces less cost per passenger and per passenger mile. There could not be such a difference of density, I imagine, in two parts of the road, as to materially affect the cost per passenger. As cars must be furnished to meet the maximum demand anywhere between terminals, a train might run over two divisions where the density would vary, but the train would not change the number of cars, and the expense would be relatively the same on that account. Where the trains over two divisions were separate, the density on one division over the other would not affect the cost per passenger mile, or per mile. You have a greater number of passenger miles in that train; you can spread that expense over the greater number of passengers. This 65,000 passenger miles per mile of road is the whole system.

The Master: What bearing does that have on this case, if it were more in some parts, and the cost per passenger mile were less in some

parts of the road than in others?

Mr. Wykes: It has just this bearing. The places where the high cost due to scarcity of travel, exists on the South Shore are those places where the travel is more largely interstate; on the Nestoria Division, for example, where the interstate business is six times the intra,

there are very few passengers, as compared with the Houghton Division, for example, where the traffic is mostly of the other character, and I think it has a very great bearing on this case.

Mr. Butler: How?

Mr. Wykes: If the high cost per passenger exists on those lines that are almost exclusively devoted to interstate business, the answer is apparent how.

On the Houghton Division, there is probably a greater density of

population.

Q. Then, getting back to the question of the use of property, there would be less property involved in carrying a passenger,—that is per passenger,—where the traffic was more dense, assuming values to be equal on two lines, would there not?

A. That is because there would be a greater average of passengers

carried per car?

Q. Per car and per mile of line?

A. I don't know that that would be true. You would merely fill up your space that you already furnish and which is not employed, on the South Shore, according to these figures, there is room for 81 more passengers per train, on the average.

Q. Assuming that on one line those trains are nearly full, and on the other line they are nearly empty, in the one case there would be greater use of property per passenger, would there not, than in

the other?

646 A. That is not necessarily self evident. That illustration I made was, and any answer to that question must come back to the proposition, that the railroad must furnish accommodations for the maximum requirements between the points between which the train runs; that would mean that the use of the property, if you base it on the number of passengers per train mile, might vary on the different parts of the line. You would use the same amount of property on the line, but you wouldn't utilize in some cases the entire potentiality of that property, and in the other you would, that is all. If now you run a train that is entirely full or the average of passengers in that train practically use the capacity of the train for carrying passengers, then you would use all of the property; that is the difference; you couldn't find a condition, probably on any railroad, where a train would have the same average passenger miles between each station all the way through, or, in other words, the average passenger mile would vary as people got on and off the train. Now, the average trains, of all the trains on the South Shore, is four and a third to four and a half cars; I couldn't say what number of cars were provided on the Houghton Division expecially as distinguished from the Western Division. It would be necessary, to answer that question, that I should know the car supply and something about the details of the travel, because I can imagine, and it is undoubtedly true, it must be an absolute certainty that the same number of passengers

are not in the car between all stations between Houghton and Marquette, the part of the road with the greatest density; the full capacity might be used out of Marquette, say to Ishpem-

ing, or to Negaunee.

Q. Now, take the same proposition that you have been answering and, instead of applying it to passengers, apply it to passenger miles? Assume that there is less on one line than on the other passenger miles, then you have a greater use of property in the one case per passenger mile than you have in the other; that is self evident and that applies not only to the property in the train, but to the roadbed and everything else that is used in operating that train; that is self evident also isn't it?

A. Well, you have got to take this into consideration. You put the same amount of property in there, and you may vary the miles; you employ the same number of cars, but if you divide that now as to the use of property per passenger mile, you haven't changed the value of the property used, but if you say the value of property used per passenger mile, you have changed it; but, in the aggregate, the

same value of property is used.

Q. Take those trains that you have mentioned that run 81 passengers light; that is, they would hold 81 more and seat them?

A. That is all of them, on an average, on the road.

Q. What additional costs would there be if those trains were full?

A. Well, there would be some additional terminal cost; there would be more tickets sold, the auditor would have to audit more tickets, and the treasurer would handle more money, which might involve employing more men. The make-up or consist of a passenger train don't differ on a railroad; it runs the same, year in and year out, unless there is something special going on at some of the towns that requires additional cars, such as fourth of July, or a baseball game, or local fair, or things of that sort, but the consist of the train is the same.

Q. The train costs wouldn't be increased, then, by increasing the

number of passengers to the capacity of the trains now run?

A. Not in relation to the hauling cost, no; there might be some

minor increase in expenses.

Q. A little more drinking water and a little more ice, and things of that kind, a little more wearing out on the seats and on the carpets,

but only an increase in small items?

A. Well, you might have to increase your employees, probably would. You have to provide in every train to meet a number of people—in other words, you have got to be ready to serve any demand. A railroad would like to have it entirely full, and no margin. In this regular service, this regular consists of trains—that is, of cars that run from day to day, not changed,—it is based on experi-

ence that will be ready to service the public any day that it makes a demand. It always is a little above the actual demand, because, to keep your passengers satisfied, you want to give them seats, and it ought to be done. I will put myself on record now, as a suburban traveler, that every passenger should have a seat. Now, in answering your question specifically, the consist of the passenger train being regular, the expense of handing the particular train over its run, whatever the length of the run may be, would be relatively the same; there would be some few, as I say, minor expenses due to there being more people, the maximum service being reached.

Q. If that is true, then, the fact that there may be a greater number of passengers in a particular department, an increase in one year over another in the intrastate department, the trains continuing normal and as before, should not draw to the intrastate expenses the full proportion that would be drawn by those passengers, if you consider them in comparison with the whole number? On Ex. 43, there were 18 million plus intra passenger miles and there were 14 million plus interstate passenger miles, in 1912, the intrastate passenger miles had increased approximately two million, to twenty. They had increased approximately two million, to twenty. The interstate passenger miles had fallen off somewhat. Now, to carry the increased two million intrastate passenger miles did not involve the adding of their pro-

portion of the full cost of the service, because you were running your trains anyhow, that is true, isn't it?

A. That is probably true; it didn't increase the cost of the

service-the relation-no.

Q. The total cost of running your train, of 2 to 18? A. No, not the total cost of running your train.

Mr. Butler: That is, it wouldn't per se, it might from other conditions.

A. Yes, I mean it wouldn't, stated as you have stated it.

Q. Other things being equal, it would not?

A. No, all things being equal, that would mean that the passenger miles were the same and the conditions of operation the same.

Mr. Butler: And the haul the same?

A. The length of haul the same.

Q. Now, take on the other hand, assuming the trains were run solely for the interstate business, and the interstate passenger miles decreased from 14 million to 11 million; that would not decrease the train expense in the ratio that those figures bear to each other, would it?

A. Not if the conditions of train miles and all other things were

equal.

Q. But if, instead of the trains of the South Shore running with 81 vacant sittings, on an average, they ran with 100 vacant seats, on an average?

A. You are not decreasing the cost at all, that cost is the same, as long as you remain on the ready to serve basis. Four and a half passengers would have to travel 31 miles each to accomplish the same mileage as accomplished with one passen-

ger in interstate; that would be on the relation of 9 to 1. There might and might not be train stops for these passengers in the relation of 9 to 1, or of 4½ to 1. There would be that many terminal expenses in one service as to the other. As to the train stopping, that

might be somewhat different; it might be greater or less.

If only one passenger got off and on at a stop, it would work out on the same relation for stops. The local trains I took, stopped at practically every station, with some flag stops. I was on a purely local train, Bibon to Nestoria; the interstate passengers that were on from Bibon gradually thinned out, and people going to Marquette, Houghton, etc., began to get on. Trains 7 and 8 make stops in addition to those scheduled, generally, for passengers beyond the state line, west. I think I figured those in, in arriving at the number of stops; I am not sure. I naturally would have taken all of the probable stops. With mileage in Michigan of 143 miles, if all trains were interstate, there should be some difference between them in speed; this could be accomplished by a fewer number of stops, or by making it a faster train. In looking over the trains on South Shore I find very little difference in their speed; 7 and 8 accomplish the time between terminals at two miles per hour greater speed that the others. Assuming this road was doing only intrastate business, there should be some trains that would be run for the smaller towns,

and stop at all the stations, perhaps, and others which would afford means of communication between the places; that would depend upon the demand. It is natural that provision should 652 be made for a through service more quickly than a local ser-

vice; a railroad measures that by public demand, as expressed in the

travel.

Trains 7 and 8 answer at least two purposes, the rapid transportation between the larger cities, and for the interstate traffic as well: they carry a great many interstate passengers. Where the capacity of a train is measured by the greater volume of business between two stations, both the interstate passengers who are on it and the intra who travel between those points would contribute to making it full, and the relation in numbers is such that the spaces being used for short distances shows it is short journeys that makes that space necessary. As a general proposition in railway operation, you can figure closely how many cars you want each day for long hauls; with short haul passengers, that is very difficult; you must be ready to meet any emergency. For special occasions, such as a ball game, if the accom-odations provided would not take care of them, they would put on an extra car for that trip; they would not carry accom-odations throughout the year to answer the needs of extra travel for such purposes; but something comes up every day. somewhere on the line, they must be ready to serve.

I found three passenger carrying cars on the average train, some of them being cafe observation cars, with 15 seats, or a sleeper, ordinarily, you would have a smoker, one coach and cafe or dinning car, or a sleeper, and that, whether there would be 10 or 25 people

to use it, and a parlor car, or cafe car, or diner, or sleeper. I don't know as I would dispense with any of those cars if the 653 traffic were lighter between some points on the South Shore.

I think the cafe cars on 1 and 2 had a greater number of intrastate passengers; I could not say how it was in proportion to the number of passengers in each class. I didn't analyze that train closely, but

formed conclusions as an incident of my journey.

Other things being equal, there would not be many of the passengers traveling 31 plus miles or less who would pay the extra fare for accom-odations in the chair car; you can get a pretty long haul on the South Shore as an intrastate passenger. good many of the passengers at 31 miles or less to bring the average As a general proposition, the special service prodown to 31 plus. vided by the sleeper and parlor car would be more used by the person receiving the longer haul; it might be an intrastate haul. There is a good deal of high class travel between Marquette and Detroit and other cities in Michigan, which would use those accom-odations. The The South Shore runs a interstate travel alone would not support it. sleeper from St. Ignace to Houghton and return, probably for the intrastate passengers. The day I was on the train, we had a greater number of passengers between Houghton and Marquette on No. 1 than elsewhere on the line. On train 7, I went through the train to observe condition of operation, and that had considerably more from Marquette to Ishpeming than west of there; it would be natural that travel would be heaviest between Marquette and Houghton.

Assuming the travel to be such as it was on the day I was on the train, I do not think I should have dispensed with any of those cars, you could not very well dispense with any but the observation car. I would not have cut off any of those cars after traveling over the road, if I were managing; it seems to accom-odate and please the people. The dining car and cafe car on South Shore is as good as on anybody's road; better railroads than this do not have any better dining car service; it compares favorably with those found on other roads, and no man from New York to California could complain of it.

In Minnesota Rate Case, my testimony was directed chiefly to freight; the conditions influencing excess cost of intrastate over interstate service might vary with different roads with a lot of branch lines. The extra cost would be higher for the road with the branch lines, and my impession is, that in Minnesota case I put it as high as 40%; I don't believe in any case it could run lower than 25%.

The day trains naturally carry more local traffic; as a general proposition, the night train would be preferred by interstate traffic; possibilities of long intrastate hauls are great on South Shore, because there will be considerable travel to Southern Michigan points.

I have, more or less, for 15 years, investigated to determine the exact cost of carrying passengers; I have worked it out, and then given it up, and tried it — every angle that could be worked. I gave

it up because I did not get truthful results; anyway it could be worked, it would come, after all, to so much depending upon observation, that could not be demonstrated mathematically, that you might use it to serve certain purposes of the railway, but, take it outside the railway sphere, and they would ask you to prove it. I am still at it, and have not solved the problem yet. It

would vary according to conditions on the road, and results worked out for one road would not necessarily apply to another.

Even on the particular road that I am connected with, I am unable to get exact costs; I am not able to demonstrate it mathematically, but have them sufficient for use for statistical purposes—not sufficient to satisfy myself that I have got exact results. In discussing it with other men working toward the same end, you find that you have got where they have and there you are stuck; they have all got to the same basis, and you cannot get away from it.

I never made computations to determine the cost of terminals per passenger, or reached any mathematically correct results for that, because the impossibility of determining that definitely is obvious.

Q. And when you did get the cost, in the general way that you have stated, of carrying passengers, that was based on arbitrary

premises throughout, was it not?

A. You might term it arbitrary, if you would say that anything that is not mathematically justified is arbitrary, but your result will be closer than anybody else could get who hadn't the experience to make deductions from their observation to consider in connection with their problem.

I should say that "estimated" would be a better word than 656 "arbitrary." The division of costs calls for the application of judgment in the division of items from point to point, and would depend largely on the observation and experience of the man making the estimate. I am not testifying as to the unit cost of carrying passengers. Unit costs are very difficult; you might obtain a very few on a railroad, as compared with some other kind of business. I am not testifying as to the unit cost of carrying When you divide the costs of a stop at which you deposit 10 passengers, nine of whom are intrastate and one interstate, on the basis of nine to one, that does not attribute the exact cost of each of the different classes; it would not be a problem that any man would undertake, except, perhaps, for a purpose like this. The cost would probably not be much more for depositing six than one, except as to some of the elements entering into it. In the nine passengers, there are nine exposures to risk of accident, intrastate to one interstate. The stoppage cost might be a little greater because it would consume a little more time.

Q. You would attribute the cost on the basis of nine to one, on

your idea of that's being a fair method of separating that cost?

A. Yes, if you are going to divide that cost. I should say that the benefits are nine times to the intrastate to one interstate. The natural definitions of the word there would be if the benefit is con-

ferred by a railroad it is all attended by cost.

657 In testifying to the use of the revenue train mile basis for division of common expenses, I testified that the additional speed in the passenger department would not, of itself, offset the extra weight in freight service; there are other elements which would come in. I limit my answer, that the revenue basis could be applied to the division of general expenses to the division between states.

I stated that the element of speed in passenger trains might not of itself overcome the greater weight and number of car wheels of the freight train, because it was a matter of uncertainty; one would not want to make a positive conclusion on any one particular element, or its importance as to the balance, or as to the whole. The weight and speed would have to be taken into consideration; also the limitations of the construction of the property for the passenger service, because to construct the property at the maximum, would increase cost of freight train operation.

If it was a question merely of weight or speed, all other things being equal, I would say that that, of itself, would not be sufficient; as to the effect of operating a heavier train at a low speed over a track constructed for high speed, I believe it would be a proper considera-

tion to make one the equivalent of the other.

That element was the elevation of the outer rail on curves, and the broadening of the gauge, to meet the speed of the faster moving passenger trains, also the passenger train being preferred, and the freight obliged to take the sidetrack in

meeting and passing, wears switches and frogs.

I might have pointed out other elements to offset greater freight weights in my direct testimony that would have related to the grand account of maintenance of way and structures, but these are all I

can call to mind at present; those would appear in the maintenance of way account in rails, track material, ties, roadway and track and roadway stores and supplies. The ultimate strain of centrifugal force varies in proportion to the weight and motion. The engineers have a formula something like the square of velocity; I don't think there could be any doubt about the fact that centrifugal force would be greater with greater weight. The chart, (Complt.'s Ex. 63), indicating delay of freight trains due to passenger trains is for Houghton Division only. Conditions are not necessarily the same on all three divisions. The traffic is heavier on Houghton Division; I selected it because it was the shortest mileage, and I could get it done quickest. It is obvious that the greater the number of trains, the more meetings and the more delays. The meeting places are shown on the chart; these scheduled meetings are to get the passenger train by the freight train, and to get the freight train by the passenger train, on a single track.

It is requisite that a freight train pass the passenger train as much as that the passenger train pass the freight train; the only thing is

that a freight train takes the sidetrack and waits for the passenger train's arrival; the passenger trains do not have to 659 wait. If you are running passenger trains 35 to 40 miles an hour. I would not take chances on less than 30 miles ahead of the passenger train; it would be different for a train running 22 to 24 miles an hour. On the time card, freight trains are scheduled closer than 30 miles an hour; that is a matter of arrangement. The 30 miles an hour refers to when the schedules are disarranged; the train dispatcher then takes charge, and handles the train and directs the meeting points. He would have to take into consideration the train on schedule to the extent that he must provide for safety.

Q. You- allowance of 30 miles is not an allowance for two trains on schedule, with a schedule meeting point, it is an allowance for a stray train, or a train running off schedule, as against either one on

the schedule or another stray train, is it not?

A. So far as a regular orderly operation is concerned, by schedule it would be both before and behind the train, but in the disarranged schedule, it would of necessity be greater. I illustrated that in two passenger trains coming to a meeting point themselves, and there is a freight train in there; that freight train is bound to get a bad delay, unless it is exactly arranged and the actual schedule is carried out, because, if she gets into a sidetrack to allow one train to meet her, she cannot go any further perhaps in a thirty mile distance between

those two passenger trains approaching each other, the dis-660 tance 30 miles, and get anywhere else until the other train . had met her, one had passed her, and the other had met her, or vice versa. In approaching each other, a schedule might be made 15 or 16 miles apart with a freight train, that a freight train could get a movement of some sort for a very short distance. You must consider the time necessary to stop the train, to permit the brakeman to get ahead and throw the switch, then for pulling in on a passing track, around something of a curve, all of which takes time.

The time varies, I have seen a heavy freight train take 10 min-

utes to get on to a passing track; they might be able to pull in in five or six; the average would be seven or eight minutes. require a freight train to be clear of the passenger train by at least five minutes. Under normal conditions, the locomotive, in getting a start and the use of the sand, would cause wear on the track; in bad weather, with dew or water on the rail, it might cause greater wear. It would not cause as much wear and damage to track as would be done on curves or on grades.

After the passenger train has passed, the freight train is free to operate, but, as passenger runs at double the speed of freight, it necessarily leaves an opening there; it is ready for the freight train to go on to it as soon as the passenger train has passed the limit by rules preventing freight trains leaving stations following passenger,

which may be within five or ten minutes; it differs on different roads and at different stations, due to topography of track.

661 There is some service performed by passenger trains for common operation of property; the baggage cars are utilized for moving material that requires quick movement, and for stores, supplies and stationery. Company employees will be transported on passenger trains, and passenger trains would carry company mail; that, so far as it goes, is an offset in service, but the freight train service is very expensive, because carrying much tonnage of company

The business carried on passenger trains would be comparable with that bearing high rates; it would be carried in the same cars with express, and handled often by the same joint messenger and baggageman, but the volume of company material handled on freight trains is very great, including freight, ties, ballast, rail, track material, timber, lumber etc. On the other hand, the number of persons carried free for service or exchange of service is quite large.

You don't have to furnish additional cars to carry stationery and company passengers, you have to furnish both cars and, sometimes, extra trains for bulk of company freight carried. I think the number of cars given passenger trains would run about the same through-

out the year.

I think I testified in C. P. & St. L. case—the Illinois case—that revenue train mile basis was to be applied generally as to all expenses common to both, unallocated to either, without going into separate items; I made no figures for the purpose of that division.

My recollection is that, in the Arkansas Case, the division 662 of common expenses between passenger and freight was substantially the same as Complt.'s Ex. 41. In Arkansas Case, we used a different formula for station employees, being an arbitrary division of 75% freight and 25% passenger on unallocated items, due to peculiar conditions.

The same basis for the division of common expense was used in Missouri Case as in Arkansas Case, we presented one basis, the State another, and the Judge divided on his basis; in Missouri, our basis

was accepted by the State.

Both Missouri and Arkansas cases comprehended both passenger and freight rates.

In Arkansas and Missouri cases, we divided items which are comprehended on sheet 2 Complt.'s Ex. 41 Delf, on basis of 10% to passenger and 90% to freight, by using what we actually found to be the case, by making observations and determining it in hours devoted to the two classes of work; we reached a conclusion of 5% passenger and 95% freight for each state. Our yard arrangements were especially favorable, and, with rare exception, our switch engines were able to perform the freight and passenger duties.

There were a great many different terminals and different conditions comprehended in the system involved in both those rate cases, the Missouri Pacific, involving 1,400 to 1,500 miles and the Arkansas Case close to 1,400, not including second track. In

Arkansas Case, the issues were tried for two railroads, and in

Missouri Case there were 18 different systems.

I would not want to testify positively that the ratio of 5 and 95 was used for all the railroads involved, but for our company it was taken from our own test for about a week. We still carry that figure on our operating sheets. I don't know why it should be different in this case; it would depend on local conditions.

Q. The freight train mile is not the relative or the equal of the passenger train mile, is it; they are not the same thing, in other

words?

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A. Of course, no man could testify that they were exact expense equivalents, but, in considering their direct expense and those that followed because of the limitations placed upon the freight trains, railroad men who have given the question consideration have generally agreed that that is the fairest factor to use, and they have used it for their own purposes. Railroad men might differ individually as to how they reach a conclusion, how much value they gave to these tertain elements, but they get to the same place, they all get to the fact that it is the best unit that can be employed, it gets nearer the truth. Of course, if there was any better unit, they would be glad to get it.

Q. They don't all agree on that, do they?
A. They all agree on the general conclusion.

Q. That the revenue train miles basis is the best unit, is that the concensus of opinion among accountants and engi-

neers, in your judgment?

A. I won't say among accountants, I will say among operating men; you might find railroad accountants that might differ on that, because you can get up an argument on anything on a railroad, but I believe that accountants generally, and I know, practical railroad operating men, regard that as the closest unit to employ.

Q. There have been a great many accountants who have taken a different view of it, have they not, and a different view and method has been employed in the division of common expenses in cases other than these mentioned, but which you are in general familiar with?

A. Well, in the evolution of the railroad mind, pretty near every unit that is possible, or combination of units, has been employed, in an effort to get an exact result, and they have been discarded, as well as has the arbitrary division that the Interstate Commerce Commis-

sion first directed be made, they have all been discarded. Now, with the accountants, they have got a limited field for considering that question; the accountants can determine and allocate their expenses from their books; when they come to the matter of common expenses and where their book entries no longer prove to be a guide, their examination has got to stop, and they have got to consider items that cannot be a matter of accounting record. You must go in the field of cause and effect; you must consider further the practices of operation; and those are all matters that the accountant would have no opportunity to consider in the matter, and which are, after all the essentials.

be determined on the basis of the known effects, which can colly be learned by observation, experience, and the putting of all these things together. That is the reason I said a moment ago that railroad men might not agree in the detail, or the value of the various details, but they came to the same conclusion that the passenger and train mile were practically equivalents, or sufficiently so to be used as units, and give the closest determination of the expenses. Now, in making the efficiency sheets, I know of no road that don't employ that method of division; those efficiency sheets the management is testing itself, and is comparing itself, its efficiency with the efficiency with other railroads, the efficiency of the particular divisions, which of course, would reflect on the superintendence; it is tested in that way.

Q. But for those purposes relative costs are sufficient?

A. No, because one of the very first essentials, is to divide your passenger and freight expense; before you can take a step in the preparation of your operating sheets, you must determine that. 'Now, if there was any better unit in the mind of men upon which they are going to measure their own effort, they would very naturally adopt it.

Q. The dividing of these common expenses on the basis of revenue

train mileage for statistical purposes, was used long before the necessity for its use in railroad rate cases came into existence?

666 A. Yes, sir, it was the standard.

In my mind, the doubt is whether the freight train mile is the equivalent of the passenger train mile—whether the passenger train mile is really most expensive. At a certain time of the year, in bad weather, while the freight train mile appears more expensive, it is because of passenger trains. I have known of an operation six weeks at a time when it was almost impossible to get a freight train over the road because all the activities of the organization were getting the passenger trains through.

Upon the question of whether the revenue train mile basis is fair for dividing costs that don't occur on the line where the mileage is made, but which occur on branches where one class of the service is not carried at all, a railroad won't go to the expense of creating any unnecessary facilities for its operation and any of those facilities for the common benefit of both classes of traffic; if it didn't have that track, whatever it is, that is used by the freight, that business would have to be done on the main track. You either have to create a facility or do the business on your main track, in some manner.

Q. How does it relieve your main track, if you didn't build out five, six, seven or eight miles to get it, it wouldn't be there?

A. You have your railroad for the transportation of your passengers and freight, and you have your passing track, to 667 enable those trains to be met and passed, and you have your house tracks and your freight house to enable you to handle the merchandise, and you have your public team tracks on which you can receive and deliver carload freight, and you have your tracks to the stock yards and then you have your tracks to industries; now, all those facilities are necessary to enable you to do business, and the business you get from their employment gives you your revenue, and The employment of any independent tracks for one kind of business or another is merely incidental, and not fundamental. The idea is that your revenue which goes to pay your whole operating expenses and your cost of operation, which is produced by those facilities, is the point of direct consideration in this question. You might as well say that you should eliminate your stock yard tracks and your house tracks and everything on a railroad except main track and the passing tracks.

Q. But those particular things, if you can find where the item of expense on their account is, you will locate it directly, won't you, to

your freight?

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A. That would be merely the first view of the question. The question is that these facilities are all necessary to enable your business to be done, and, as I said before, in the question of division between passenger and freight expenses, if you consider that on a narrow ground, you would say I will allocate these; when you do, what are you going

to do with the revenue produced?

Q. So far as you can determine the income of those things absolutely as being of that character, you locate them in the

freight side of your problem, don't you?

A. They appear in your freight earnings and in your passenger earnings. As I understand it, you have merely taken certain tracks which are used for freight business solely, and you say this should not be considered in your general division of your expenses. don't you on the same basis, eliminate all of your house tracks, and your stock yard tracks, and, as I said before, eliminate all tracks except those that are necessarily for those trains, to enable the conductof train operation over the road, your passing tarcks.

Q. The reason you don't do that is because you are not able to separate and allocate the costs of those things that lie along the main line; so far as you can locate them, you have done it before you have come to the question of what are common expenses, and you are getting at the basis of division of those things that are common after you have set aside those that you know belong to one class of the

service or the other?

A. I see no more reason for eliminating any tracks that produce one kind of revenue from consideration here than all tracks that produce that same kind of revenue, and that would take in your yards,

in fact, there is no more justification to my mind, in eliminating any of those independent tracks; that is to say, tracks, just skin the railroad down, undress it, if you please, down to the 669 main track and the passing tracks; they are all necessary to its operation, and at times they might possibly be used; but the whole result comes down to this: In building your freight tracks for freight, you are increasing your freight tonnage, aren't you, and you are increasing your freight revenue? Now, when you get a total, because of the rates existing today, may be in just proportion to each other, but if you increase your freight, increase passenger, you are enabling the road to conduct the business of either without going into the hands of a receiver, or both, you might reduce the rates on

Q. That is really a question of economics you are talking about now and not the question of getting at the division of costs of business. Now, you have stated that the building out of these spurs in-

one class of business below a living basis; still you might keep out of the hands of a receiver, if you were able to build into a lot of indus-

creases freight revenue?

A. Yes.

Q. If they are used solely for freight purposes, that freight revenue of that part of the business should bear its own expenses, shouldn't it?

A. Doesn't it reduce the cost of your passenger?

tries and get a whole lot of freight business.

Q. Just answer my question, as to whether the freight business should bear its own expenses?

A. The freight business should bear its own expenses, but where you come to a question of interjecting in there a property value to be deducted before you divide either your revenue or your operating expenses, it seems to me you are trying to solve a question on one or two of its factors, and not employ all of them.

Q. I am not trying to get the property value in.

A. As I understand it, it is the value of this track; here is an independent facility, you say the operating expenses of that independ-

ent facility should be charged to freight, is that it?

Q. Take, for example, the Republic branch, that the Master spoke about, and eliminate from it the consideration that one passenger train passes over it; assume that it is entirely engaged in freight service, and you can find, either exactly or arbitrarily the cost of operating over that line of eight miles, should that not be directly allocated to the freight service?

A. No. You have got your other side of this question to consider, as you increase your freight business, you are decreasing your

passenger expense in common items.

Q. How?

A. Because you are making more freight revenue train miles to handle your increased freight business.

Q. Where are you making it, on the main line or on this spur? A. You are making it as a whole, altogether.

671 Q. Making it on the spur, too, I assume?

A. I don't know, but my impression is that there is no revenue derived to a railroad from the spurs, that the rates at the junction of the spur with the main track are the same as from the end of the spur-the end more remote from the track. freight business increases, however you increase it, that causes you to make an increase in your freight train miles, you are reducing your passenger proportion of the cost.

Q. Let us admit that to be true for the moment. Assume the operation on this spur is entirely freight operation; there is no passenger operation at all; it costs money to operate it. Now, what business produces the cost? Is it the freight operation on that spur, or

is it the passenger operation on some other part of the line?

A. There may be there, if it can be allocated a direct cost, that is apparently freight, but what is the effect of it; doesn't it help to decrease your passenger expenses?

Q. That may be true, but the freight operation produces the cost, doesn't it? I would like to have you answer that by yes or no, if

vou can.

A. I should say, directly, yes, assigned to that particular piece of track, but, as against that, you haven't any revenue from either de-

Q. Now, if we treat that as common expense, and divide it on the basis of the revenue train miles, a part of that expense goes into the passenger expense, does it not?

A. Yes.

Q. And that will be in the proportion that the revenue train 672 miles in one department bears to those in the other, those costs or expenses that are due to maintenance that is caused by deterioration or age rather than wear, what relation have those to train movement?

A. The whole of the railroad, in all of its activities, is devoted to only one thing, that is the movement of trains, and anything incidental to that road that is necessary to keep up, regardless of how it was caused, bears its relation to the operation of the trains, because

that is all the railroad was built for.

The wear by age goes on, whether you move any trains in passenger department or not, but the only activity of a railroad is its train operation. If next year you move only half as many trains on the South Shore in the passenger department, and the same number in the freight department, the same amount of deterioration, age and cost of maintenance due to that would exist, and, using the train mile basis as the basis, you would only draw half as much to the passenger department as in the previous year; or you could reverse conditions, and draw half as much to the freight department. You could make any proposition, and get a conclusion from it, but these are not conditions that would in any probability ever arise. Year by year, the relation of your passenger and freight train miles will be very close; there may be some special occasion that would change that relation.

The tendency is growing to larger locomotives and longer freight trains, which involves less freight train miles. The substi673 tution of different types of locomotives, that will draw three to five cars more in freight service, will materially affect the number of freight train miles. The heavier units make greater cost of maintenance; most of any of these railroads 20 or 25 years ago would not stand the traffic of today, 56 pound rail was once considered good track but today we want 80 to 100, which is occasioned by the weight of the units just referred to; the bridges are constructed to bear more than double the weight. The increase in the size of cars and locomotives creates a much greater expense in operation.

The primary purpose is to decrease costs, and even that result in handling freight business serves to decrease the cost of handling passenger business. There is not much difference between the weight of present day freight locomotives and the larger passenger locomotives. The number of cars drawn by a passenger train has not increased in the ratio with the number drawn by a freight train, as weights of those are considerably different. They began to use

this revenue train mile basis a good many years ago.

I don't know that there is any increase in number of cars per train over a number of years ago, but there is in the number of tons per train. We don't use the number of cars in a train any more as representing freight statistics; it is disregarded, we deal altogether with gross and net tonnage, today, per train mile.

Referring to the question of whether I had made any investigation to determine what part of wear on curve is due to 674 elevation and what part is due to the fact that trucks of freight cars do not adjust themselves to the track as readily as passenger trucks, it is a fact that the freight truck is not calculated to meet that condition that the track is elevated for. It is not a matter of speed, the freight track answered the purpose for freight transportation. If there were no elevation, there might be some wear due to freight trains on curves, but it would not be so much. I never made any investigation to determine the proportion of wear due to restoration of the train line after passing the curve, where there was not any elevation, and due to elevation of the outside rail; that can only be observed in yards; on the line you have both elevation and curve. I attribute great wear on curves to the elevation of the outer rail.

There would be some elevation for a freight train speed, you know, and whatever wear was caused on a track that was adjusted for the freight train business on the curve would undoubtedly take place; it would take place, however, in a lesser degree. I have never investigated those two separate things to determine what proportion of the wear one causes and what proportion the other causes.

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On April 22, 1913.

NELSON CADARETTE, a witness called by plaintiff.

Direct examination.

By Mr. Butler:

I am Assistant Engineer of plaintiff; I have been in that company's engineering department since Nov., 1891. My work has been particularly in maintenance of way and buildings; I have been over the line a great deal and am familiar with its location, lands used for railroad purposes, records, charts and maps, the latter being

kept under my direction.

I furnished Mr. Riggs the records, maps, charts and other information referred to in his testimony. I furnished him Complt.'s Ex. 2, Riggs, condensed profile, horizontal scale, 5,000 feet to inch; vertical scale 100 feet to inch; Complt.'s Ex. 3, Riggs, blue print map of Soo terminal, scale 150 feet to inch; Complt.'s Ex. 4, Riggs, St. Ignace terminals 200 feet to inch, Complt.'s Ex. 5, Riggs, small map, Marquette and vicinity, scale 2,000 feet to inch, Complt.'s Ex. 6, Riggs, map of Marquette, scale 200 feet to inch; Complt.'s Ex. 7, Riggs, map of north Marquette, 200 feet to inch; Complt.'s Ex. 8, Riggs, Map of Negaunee mining district, 1,000 feet to inch; Complt.'s Ex. 9, Riggs, Map of Humboldt yard, 100 feet to inch, Complainant's Exhibits 10, Riggs and 10a Campbell, map of L'Anse, 100 feet to inch; Complt.'s Ex. 14, Riggs, sample page of track record, Complt.'s Ex. 15, Riggs, map of right of way Negaunee and Ishpeming, 400 feet to inch; Complt.'s Ex. 16, Riggs, map of D. S. S. & A., Houghton yard, scale 50 feet to inch; Complt.'s Ex. 19, Mason, map of Baraga yards, scale 100 feet to inch; Complt.'s Ex. 20,

676 Hutula, map of Covington town site, scale 100 feet to inch; Complt.'s Ex. 21, Wallen, map of Ewen yard, 100 feet to inch; Complt.'s Ex. 22, Hamar, Chassell, 100 feet to inch; Complt.'s Ex. 23, Oakley, another map of Covington, used by E. W. Allen, in his testimony and Complt.'s Ex. 24, Kunze map Sidnaw, 100 feet to inch. All these maps are from original records, or from re-surveys in my office, and show correctly what they purport to show.

veys in my office, and show correctly what they purport to show. I gave Mr. Hansel and his assistant full and free access to all the records of engineer's department, including bridge and other records

I have referred to: they used the same freely.

On January 27, 1914.

CADARETTE recalled.

Further direct examination.

By Mr. Eldredge:

The principal use of the heating apparatus at the Soo is to heat passenger coaches in the yard; also, the passenger station and freight

house office (14 feet x 20 feet) are heated from the same house. think there are four small radiators in the freight office, and that not more than .5% of the steam created in the plant is used in heating that office. With that exception, the heating apparatus is used entirely in passenger service.

The wye at the Soo, allocated to exclusive passenger business, is

not used for freight locomotives.

The combination freight and passenger station at Brimley 204 square feet, is used for exclusive freight, 276 square feet is 677 agent's and telegraph operators' room, and 320 square feet for waiting room.

The waiting room at Wellsburg is 210 square feet and telegraph

office 81 square feet.

At Strongs the waiting room is 256 square feet and office 128 square feet; replaced with new buildings since 1913. The freight was formerly kept in an old box car body, allocated to freight.

At Soo Jct, waiting room is 576 square feet and office 144 square feet, freight room 360 square feet; the office is used for joint freight and passenger, and over the men's waiting room of 288 square feet and the office of 144 square feet are rooms occupied by the agent as living rooms.

At Eckerman the waiting room is 192 square feet and office 192 square feet, the office is used as telegraph and ticket office combined.

At Newberry the office in passenger station is 320 square feet; the office is the only part of the station I would not call exclusive passenger; the agent has his telegraph and express office there.

The agent spends most of his time in the office, in passenger station; I cannot say whether he has an office in the freight building; he probably transacts some freight business in the passenger depot, as the trainmen get their orders and things of that kind there. Assuming he does all his freight business there, about one-half the office should be allocated to freight. He has to spend a good deal of his time making out his way bills and abstract, and one thing and

another, and, I think, equally as much time selling and keep-

678 ing account of tickets.

At Seney the office is 150 square feet and waiting room 225 square feet; the office is used for selling tickets, taking care of freight business locally, giving train orders, a small amount of express business, and such commercial telegraph business as there is.

At Wetmore the office is 150 square feet and waiting room 225

square feet; second story is used as agent's dwelling.

At St. Ignace, the passenger station is exclusively used for passenger business; the freight office is in another building, the agent spending some time in both places; I think they have a telegraph

operator at both offices.

At Marquette, 3,325 feet of the first floor is devoted to exclusive passenger; 350 feet occupied by entrance to second floor is devoted to common; the second floor contains 3,675 square feet, used for offices of General Superintendent, Assistant Superintendent, Road-masters, Train Dispatchers and General Superintendents' clerks. 525 square feet would be occupied by train dispatchers; we have no dispatchers at Thomaston, and all main line dispatching is done from this office; 150 square feet is occupied by Assistant Superintendent, whose duties are confined to Michigan; 200 square feet is devoted to chart room, where time tables are prepared; and 525 square feet by Car Accountant; the basement is occupied by heating plant, used for heating the building and the cars standing in the yard; 90% of the heat goes for the cars. In view of the fact that there must be a passenger station there, and that that passen-

ger station would require a roof, I should say one-third the value of the building should go to the upper part and two

thirds to the passenger business.

At Negaunee the building stands on South Shore land, and is owned jointly by C. & N. W. and D. S. S. & A.; there is no use except

for passenger and express.

At North Ishpeming there is no use except for passenger, express and telegraph office; the freight office is in the freight building; just one desk with instruments on it, 18 or 20 square feet is occupied by telegraph. Except the use by telegraph operator, if used for giving

train orders, the use is exclusive passenger.

At Champion the passenger station contains two waiting rooms, 432 square feet and 288 square feet lunch room, 240 square feet and office, including telegraph and express office, the same as at other similar stations, 240 square feet. The agent has an office in freight station, for freight business but there is no telegraph office there. One-half the passenger station belongs to St. Paul road, and one-half to D. S. S. & A.; the space occupied by the two companies' Telegraph offices is 240 square feet. 15 or 18 square feet of office space is occupied by telegraph—just enough for a desk. The express office is a separate building. Except for telegraphing, the Champion station is used in exclusive passenger.

At Nestoria the passenger business contains two waiting, a lunch, baggage and office rooms; the office is used for ticket sales, train orders, and Nestoria freight business. The office occupies

680 240 square feet.

At Lake Gogebic, the dining hall, since spring of 1913 is

used as a residence by South Shore agent.

At Thomaston the station contains waiting room, 410 square feet, lunch room, 399 square feet, office, 252 square feet and second floor, contains 252 square feet, used by Assistant Superintendent, when at Thomaston over night. Assuming upper portion joint freight and passenger, and excluding office, 25% of the building ought to be common; the office is used for telegraph, freight, selling tickets and in part by Assistant Superintendent as office when he happens to be there.

CADARETTE.

Recross-examination.

By Mr. Wykes:

At Brimley station the office is entered through the waiting room; if you went there to send a telegram, or had freight business with

that office, or took an express package for shipment, you would use the waiting room, and must use it to make any one of those uses of the offices.

That same thing is true at Wellsburg.

Wellsburg has a population of 10 or 12—the section foreman, his crew and the children—both passenger and freight trains would receive orders from that station.

At Strongs the same use would be made of the waiting room as at

Brimley and Wellsburg.

That is true of practically all the places where the office 681 bears a common use, or a partial freight use. There is no other way of getting into the office, except through the waiting room in most of those stations; a person doing a freight business with these offices uses the waiting room to get in and out, and for waiting around for receipts, bills, etc. There is the same use of the Newberry passenger station waiting room for such freight business as is done in the office there.

The agents occupy living rooms on the second floor of passenger stations at L'Anse, Covington, Paynesville and Keweenaw Bay; notwithstanding this use, stations containing rooms so used have been, in Complt.'s Ex. 1a, Riggs, assigned to passenger service. Where the living rooms of employes were in a separate building, that building has been assigned to common, as a rule. I should say practically the entire second floor of the Marquette station is in common service.

CADARETTE.

Redirect examination.

By Mr. Eldredge:

Trout Lake, in my judgment, 20% of the building should be assigned to the second story, used as living room for the agent. I think in those cases where buildings contain living rooms upstairs there should be a little more detail as to the allocation than Complt.'s Ex. 1a, Riggs, contains.

At Soo Jct. part of the second floor is a living room, and 20% of the building should be so assigned. At Wetmore one-third of the building should be assigned to the second floor use for living rooms and the same at L'Anse, Humboldt, Keweenaw Bay and

682 Paynesville. At Covington, the living rooms on second floor occupy but part of the building, and 20% of the total should be assigned to the living rooms. At each of those buildings where there is no upper floor, the station would still be required and must have a roof.

The portions fixed of parts used as living room were proportioned of entire building, and the same percentages would prevail applied

to value as for space.

CADARETTE.

Recross-examination.

By Mr. Wykes:

I say one-third the Humboldt station is used by second story, on theory that you must have the roof, the foundation and two-thirds of the wall and material, anyhow. I simply place the extra amount that is added in buildings having a second story to the use to which the second story is put. The second story needs every part of the foundation, and the roof; we have provided, in instances, living rooms for agents or employees not in station.

CADARETTE.

Redirect examination.

By Mr. Eldredge:

I went over the line in July, 1913, and checked by actual measurement the dimensions of all stations and other structures, and their use, and correctly reported the dimensions to Mr. Riggs. I have examined Complt.'s Ex. 1a, Riggs, as to the items of station buildings and fixtures, shops, enginehouses and turntables, water stations, fuel stations, warehouses, docks and wharves, and miscellaneous

683 structures, and find that Mr. Riggs has used the dimensions and figures correctly, upon the information that I gave him; the mistakes of Mr. Riggs were mistakes in allocation and not in description.

CADARETTE.

Recross-examination.

By Mr. Wykes:

The office in the passenger station at Seney is used by the agent having charge of both freight and passenger business there, and for the telegraph instruments. I testified with regard to one station, that persons going to see the agent on freight business would, of necessity, have to go through and stand in the waiting room while they were talking with the agent or waiting for him, even though they went to see him on freight business. That is true in practically all these cases where there is an office for the use of a common employee in a station building; that is, that the persons who go to see him would go to see him at that office, and use the waiting room for that purpose, and to wait for him; this is the general rule.

St. Ignace station is used in telegraphing; the same for downstairs

of Marquette station.

The cost of ticklers, omitted from Riggs' appraisal, wouldn't be less than \$15 or \$20 each. There are two or three around Mar-

quette; there are a number of others on the line; I cannot locate them; they would be where there is an overhead obstruction which we have around the iron mines, and in some cases at saw mills.

684 I don't know of any on main line; those at Marquette are on freight tracks.

CADARETTE.

Redirect examination.

By Mr. Eldredge:

The actual cost of bridge 94D was \$18,830, at which it was included in Riggs' inventory.

CADARETTE.

Recross-examination.

By Mr. Wykes:

This is the gross charge, and includes loading and unloading of material, and does not include transportation of many items, percentage for use of tools, or overhead costs; just the actual costs of

labor and material is kept track of.

The ballast record of the South Shore has been kept since 1891. From that record, I have prepared a table stating the condition of main line track, Dec. 31, 1891, and the amount of ballast of the different kinds at that time and that added since for each year, to June 30, 1913. I also show an estimated amount added for the balance of the calendar year 1913. For each year, 1892 to 1912 inclusive, the period is by calendar years, and in addition I show the condition of track, June 30, 1913, with the mileage of ballast of each different kind. The 50.7 miles is for the calendar year 1912. A portion of the ballast of late years has been carried in regular revenue trains of the company; some of that has been done in every year. Where the ballast is hauled in revenue trains, the haulage cost would not appear in the charges against ballasting.

(The statement prepared by the witness is as follows:)

684a

Dec. 81, 1891 239.3 99.2 77.0 1.6 2.3 419.6 Added 1892 2.8 2.7 9.0 1.2 5.94 33.5 1894 3.2 2.8 24.7 6.3 1.7 35.5 1894 3.2 2.8 24.7 6.3 1.7 35.5 1896 2.8 24.7 6.3 1.7 35.5 1896 2.0 2.4 7 8.1 1.7 35.5 1896 2.0 2.4 1.8 3.0 45.7 3.0 45.7 1896 2.0 2.1 2.1 1.1 1.2 3.0 45.7 1.4 2.1 3.3 1.4 2.1 3.0 45.7 1.9 2.1 3.5 3.0 45.7 1.9 3.0 45.7 1.9 3.0 45.7 1.9 3.0 45.7 1.9 3.0 45.8 3.0 45.7 3.0 45.8 3.0 45.8 4.4	Conditto	n of track.	Fine sand.	Sand and gravel.	St. Ignace gravel.	Mine waste.	Stamp sand.	Cinders.	Total miles.
1891 239.3 99.2 77.0 1.6 2.3 1892 2.8 24.7 4.9 1.2 5.3 1893 2.8 24.7 6.3 1.7 1894 2.8 24.7 6.3 1.7 1895 2.8 24.7 6.3 1.7 1896 2.0 2.0 9.8 5.0 1897 2.0 2.1.3 19.1 3.1 1896 2.0 8.1 2.8 3.3 1900 2.0 2.1.3 19.1 1.9 1902 1.1 12.0 9.0 2.1 1903 1.1 12.0 9.0 2.2 1904 4.3 2.2 2.4 1905 6.8 11.8 5.9 2.1 1904 7.9 18.8 5.9 2.1 1905 7.0 4.3 5.2 2.4 1906 7.0 8.1 10.0 2.0 1907 8.1 10.0 2.0 2.0 1908 8.1 10.0 2.0 2.0 1912 1912 1.5 1.0 4.4 1.6 1912 1.5 1.5 1.	-		-						
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ition of track June 30, 1913 16.1 194.9 139.4 25.3 43.9		Totals	19.6	143.0	207.3	1.2	36.2	8.89	64.83
THE PARTY OF THE P	onditi	on of track June 30, 1913	16.1		139.4		25.3	43.9	419.6

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On May 5, 1914.

CADARETTE recalled.

Further cross-examination.

By Mr. Wykes:

I have prepared a list of the culverts, to indicate the changes made in culverts between June 30, 1911, and June 30, 1913, including both those due to changes in appraisal and changes by replacements. That furnishes the details of the changes in culverts on pages 28 and following of Complt.'s Ex. 1a, Riggs. The information I have prepared is as follows:

73 old wooden box culverts found in 1913 to be caved in and abandoned as waterways and called filled in the 1913 appraisal. No date of abandonment.

26 old wooden box culverts replaced with cast iron pipe between June 30, 1911, and June 30, 1913. Old box taken out and back-

filling put in.

15 old wooden box culverts replaced with concrete pipe between June 30, 1911, and June 30, 1913. Old box taken out and backfilling put in.

4 old box culverts rebuilt with wood between June 30, 1911, and

June 30, 1913.

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16 wooden box culverts found to have been omitted from 1911 appraisal.

4 additional cast iron culverts put in between 1911 and 1913 ap-

praisals, not replacements.

7 additional wooden box culverts put in between 1911 and 1913 appraisals, not replacements.
 5 additional concrete culverts put in between 1911 and 1913 appraisals.

ditional concrete curverts

praisals, not replacements.

2 additional concrete pipe culverts put in between 1911 and 1913 appraisals, not replacements.

1 cast iron pipe culvert omitted from 1911 appraisal.

10 open culverts found in 1913 to have been changed to box culverts. No date of change.

On July 21, 1914.

CADARETTE, recalled.

Redirect examination.

By Mr. Eldredge:

I have compiled a statement showing the percentage of curves, straight track, etc., on the main line of the company in Michigan.

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Miles of ascending and descending grades.	254.79	39.79	14.08	33.48	6.81	348.95
Miles of level line.	46.75	3.18	3.25	14.76	1.89	69.83
Miles of straight line.	254.16	39.83	8.20	34.18	5.90	342.37
Aggregate length of curves (miles).	47.38	3.04	9.13	14.06	2.80	76.41
Number of curves.	289	19	52	81	56	467
Miles.	301.54	42.97	17.33	48.24	8.70	418.78
-T0-	Wis. State Line	Soo Junction	Winthrop Jet	Houghton	Republic	
						Total

Houghton. In the past, it has been used for shipping rock by boat to canal entry near Houghton, and logs have been unloaded there. The principal use I remember was when Portage Lake bridge was wrecked in 1905, when freight going north of Houghton was transferred across the lake at this point. In my judgment, it is necessary for the South Shore to use, as it is its only water front property north of Baraga; it has tracks paralleling the shore for its entire length, within 15 feet of the water's edge. The water is deep to the edge of the land, so boats of reasonable size can go within a few feet of land; should Portage Lake bridge again become injured, we should have to ferry, as we did before. Such an accident nearly happened this spring.

CADARETTE.

Recross-examination.

By Mr. Wykes:

In figuring curves on this line in Michigan, I have taken all curves of every degree, and didn't separate into different degrees of curvature. In figuring the amount of level line, I have taken all

grades of every elevation or change of elevation.

The Houghton water front was used for stone work purposes to 1900, about four or five years before which it was used for transferring freight. When the bridge is out of commission, we run trains on it. We load the cars on scows at that point, and tow across

the lake, and there transfer to Mineral Range. That was during the season of navigation of 1905. We used the old trestle for that purpose. The scow can go only within 15 feet of shore. We transferred no passenger cars that way.

(This witness was later called to testify before the Court.)

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On April 24, 1913.

CHARLES HANSEL, a Witness called by Defendants.

Direct examination.

By Mr. Wykes:

I live at Cranford, New Jersey; am 52 years of age. I am a civil engineer, economist and investigator, with offices in New York. My experience and education may be detailed as follows:

 Locating and Constructing Engineer for Denver and Rio Grande Railroad, four years. Division Engineer, in charge of buildings of first division of the Denver and Rio Grande into New Mexico.

2. Chief Engineer, Wabash Railway, at age of 25, 1884 to 1889. During that time, originated premium system for inspection of railroads, which has since been adopted throughout the United States.

3. First Consulting Engineer, Railroad and Warehouse Commis-

sion of Illinois. Sent to Europe, by State of Illinois, to report on railroads

4. Commissioner to Europe for the World's Columbian Exposi-

tion.

5. Vice-President and General Manager of the National Switch and Signal Company. Installed important signal work on all trunk lines in America and the first automatic signal system and power interlocking plant in England.

6. Devised complete system for commercial accounting and cost

finding.

7. Commissioner, appointed by the Governor of Michigan as a Member of the Board of Review, to adjudicate problems connected with the State Valuation of Railroads. See Department of 689 Commerce and Labor, Bulletin 21, entitled "Commercial Valuation of Railway Operating Property in the United States."

in 1904, p. 77, as follows:

"In order that there might be no question as to the suitability of the methods employed, a board of review was appointed consisting of Mr. Octave Chanute and Major G. W. Vaughn of Chicago; Mr. Charles Hansel of New York; and Prof. Charles E. Greene of Ann Arbor. All these gentlemen are members of the American Society of Civil Engineers, Mr. Chanute being a past president of the society. With years of experience to ripen their judgment and with minds free from all details, they are asked to consider the different questions arising in the work about which there might be doubt, and to formulate rules for procedure in those cases admitting of a variety of opinion, as, for example, the division of rolling stock in interstate roads, the value of right of way, the percentages to be added for the items of engineering, legal expenses, interest and discount, organization and contingencies, and many others."

8. President of the firm of Charles Hansel and Company.

9. Chief Engineer, Cincinnati Union Depot and Terminal Com-

pany.

10. Commissioner appointed by Gov. John Franklin Fort of New Jersey, on May 4th, 1909, to appraise railroad and canal property in that state. The Legislature of New Jersey, in 1910, decided to have the work of revaluation of railroads conducted by one commissioner, Charles Hansel. During the past year, some 80 men have been engaged in surveying every foot of railroad property in the This will be the first complete work of the kind ever at-State. tempted.

11. Member, American Society of Civil Engineers.

12. Member, Special Committee of American Society of Civil Engineers, on Engineering Education.

13. Member, Engineer's Club at New York.

690 14. Member and Past-President, Chicago Engineers' Club. 15. Contributor to North American Review and various technical journals.

I am engaged to supervise the valuation of the Pennsylvania railroad and its affiliated companies, and in the second place I am a member of the eastern committee of four appointed by the special committee of railroad presidents, consisting of 18 presidents, to confer with the Interstate Commerce Commission and assist in conducting the valuation of all the railroads in the United States, under

the Federal Valuation Act, socalled.

The Indiana Harbor R. R., now consoldiated with the New York Central, was constructed from Indiana Harbor to Dansville, Illinois, 110 miles in length, double track, and crossing the arteries of 23 railroads east and west, the majority of which crossings were at grade. I was in charge of the negotiation of all the contracts for these crossings with the other railroads. I also had direct charge of designing and installing all of the water stations, and was Consulting Engineer for the whole system, and at different times I acted as President. From the time we began construction to the time we got in operation was about nine months; handled about six million yards of earth.

The New Jersey appraisal comprehended 125 corporations. The majority of them are involved in what might be termed seven systems; for instance, the Central of New Jersey has 27 subsidiary corporations. The systems are the Pennsylvania, the D. L. & W., the Lehigh Valley, Erie, Central of New Jersey, and the Susquehanna & Western. I was in absolute charge of everything, and the officers of the State were called upon under the joint resolution to assist me

in anything I asked of them.

I was engaged to make a valuation; after having done so, I incorporated that valuation into an assessment for taxation. After that, the State retained me to defend the assessment in the appeals of the railroad, so the whole time was over two and half years. The highest number of men I had engaged was 110; we cross-sectioned every foot of railroad and got our own data, as very little data existed in the hands of railroad companies, because it was an accumulation of little old companies incorporated into a big system, and they themselves had very little information, and it was so important in value that we ignored all data, and cross-sectioned, measured and calculated every item in the State.

New Jersey is more or less of a terminal state; consequently the percentage of miles of route or distance between points to the total miles of all tracks is small. In other words, while there are but 2,550 miles of route, there are over 5,500 miles of track, there being

considerable third and fourth track there.

With reference to my connection with the Michigan 1900 appraisal, a board of review was appointed consisting of Mr. Octave Chanute, Major G. W. Vaughn of Chicago, Mr. Charles Hansel of New York, and Prof. Charles E. Greene of Ann Arbor, they were asked to, and did, consider the different questions arising in the work about which there might be doubt and to formulate rules of procedure in those cases admitting of a variety of opinion, etc.

The plans on the Cincinnati work in which I am presently engaged as Chief Engineer call for an investment of about 35 million.

In the detail I have given of my experience, I have just given the principal employments and works that I have been

engaged in, to show the variety of experience, instead of all the ex-

perience.

It might be interesting to observe that in New Jersey is found all of the problems of construction that are to be found in all of the other states. For instance, we have the heaviest construction, in New Jersey, of any state in the Union; that is the D. L. & W. cut-off. Then we have some of the cheapest construction; we have the most costly tidewater terminals; then we have tunnels in various classes of rock, some in the hardest in the United States; then we have subaqueous tunnels and canals, which we valued.

I began my investigation of South Shore August 5, 1912. I made an inventory, and found the cost of reproduction new and the present value of the entire property engaged in railroad business in Mich-

igan.

Defts.' Ex. 15, Hansel, is my inventory, and contains my results.

I proceeded upon the specifications as shown upon page 5.

The prices applied and the items and property taken were as of October 1, 1912, as nearly as I could fix it. The prices were obtained from my experience and office records, where I have a great deal of such data, and extensive compilation of unit prices. Those prices were checked with the actual costs to the plaintiff of certain of the same class of articles, as indicated by the books and vouchers, and in my judgment the prices used are fair, reasonable and proper. They

would be fair not only for October 1, 1912, but also for a con-693 siderable period before that time. The prices given to us or found on the purchasing agent's or auditor's books, were surrounding or before that period. For a year or more before this date the prices would be lower, because meterials and labor have advanced. I endeavored to give plaintiff credit for what they would

have to pay about October 1, 1912.

My experience has indicated that the tendency of prices to October 1, 1912, was up. General tendency applying to all items that enter into railroad construction would indicate that during the past few years there is a more or less upward tendency in prices. The labor and material costs more money. On some things, where skill comes in, such as concrete, we are cutting down the price. The ratio of operating expenses to earnings is converging. The only thing which can keep them apart is the volume of business.

Defts,' Ex. 17, Hansel, is framed upon Complt.'s Ex. 2, Riggs; the areas upon it within the red line are intended to show what I find to be the land presently devoted to railroad use. It applies only to

rural lands.

The purpose of the plan was to include, as devoted to railroad use, the part within the continuous red line, except where it is excluded by the broken line within it. Where the continuous red line is made by a broken line it is intended to indicate that the company had no deed to the property, but were occupying it, and we gave them the benefit of ownership, as if they had a deed. Opposite the line from place to place is a statement of the number of feet held or owned by the company. The lands in the smaller villages are included in Defts.' Ex. 17, Hansel, except where we have furnished de-

Where we stopped computing the rural right of way and began the computation of high priced copper or city lands, that is indicated by a dark line drawn at right angles to the right of way with a cross at each end. Defts.' Ex. 17 is intended as a graphic description of what is indicated on page 16 of Defts.' Ex. 15. Being on a very small scale, it can only be graphic and approximately correct. Defts.' Ex. 18, Hansel, is a blue print map of Sault Ste. Marie, showing the lands of plaintiff (in red) and Soo line (in yellow) and Soo Union Station grounds (in black). Each parcel referred to in Defts.' Ex. 15 is given a corresponding number on Defts.' Ex. 18.

Land on Defts. Ex. 18 included within the single yellow ink line is that which in my judgment is devoted to railroad use by the two companies at the Soo. I have considered them as operating as a whole, and allow them the necessary land for joint operations, and divided the land between them equally. I have indicated on the

map the non-railroad use in yellow lettering.

I did not include any of the property of the depot company in the body of the report (Defts.' Ex. 15), but included it in the appendix (p. 256). The value stated opposite various descriptions of land (pp. 17-22 of Defts.' Ex. 15) are the present value of the land. That figure represents my judgment of the present value of each of these descriptions, and I would consider that was the value to acquire, considering all the elements. I did not depreciate any values for land. The value opposite each description is the value or cost to acquire which I have fixed.

Total value of land used by South Shore in Chippewa 695 County is \$55,423; by Soo Union Depot \$56,600; total \$112,023. In getting at the value of land for Chippewa County, we examined the prices placed on the property by Mr. Riggs, investigated the character of the property, and based our conclusions on those investigations. Our differences are mainly in area for property in Sault Ste. Marie. I have practically accepted Mr. Riggs'

prices for that.

In the mining district, values are very problematical, depending greatly upon the owner of the mineral rights in some cases. In the Negaunee and Ishpeming districts, we established a value of \$3,000 an acre in the active mining portions and \$1,000 in the potential mining district. The values in Ishpeming and Negaunee were taken at a higher figure.

Defts.' Ex. 20, Hansel, is a detailed map showing the railroad property included at Marquette. The descriptions are identified on it by the numbers appearing opposite the descriptions (on pp. 19

and 20 of Defts.' Ex. 15).

Page 18 of Defts.' Ex. 15 shows railroad (red and green) and non-

railroad (vellow and brown) use.

At Marquette, we separated the shore front property, in that we gave it a value for the riparian rights separate from the up-land value; we examined the records, to ascertain the considerations which had been given for various properties, and also the assessed value, as a factor in aiding us in our conclusions. We ascertained the value of

contiguous and similar property, and made some inquiries of real estate men, though not extended. Based on those in-696

vestigations, I arrived at the values stated.

In getting the values of \$1,000 and \$3,000 per acre in the Ishpeming and Negaunee districts, we investigated, as far as we could, conditions attendant upon construction there; owing to the mineral rights, the conditions were ususual. The analysis of such purchases and payments as have been made would, in our judgment, average through that territory \$3,000 in the active, and \$1,000 in the inactive, districts. The value must of necessity be an estimate and a matter of judgment. Our judgment was dependent in part upon the inquiry and upon knowledge of prices paid in condemnation proceedings.

While some of it would be higher, some of it would be lower, and it is impossible to judge it accurately. I don't know of any expert in that particular class of values; I don't pretend to qualify as such. It is the same judgment that I would give a client of mine who had engaged my services to tell him what he could do in a certain territory. This is my judgment, all through. It was based upon my belief as much as anything, from experience, and going over the ter-

ritory, and inquiries made by myself and my subordinates.

Defts.' Ex. 21, Hansel, is a blue print showing descriptions in the mining region. The values through the mining district were arrived at in the way just described. We did not there take into consideration the normal value as reported by the Tax Commission.

In reaching the land values in the various places, we used whatever information was available, and made inquiries as we could, except in the cases of rural land, and observed carefully 697 the conditions, character of soil and location, and, to some extent, used sale values. In Marquette, for example, we took them from the county records, assuming that the specific consideration was correct. The sale value is oftentimes hard to get at from the records. I would rather have the opinion of a man experienced in getting right of way than to depend upon the sale values shown on the

The values I placed upon the land are, in my judgment, fair and reasonable, and I have also included sufficient values for rural lands to take care of the added percentages for cost to acquire for railroad

purposes.

My values for land throughout represent my judgment of cost to acquire for railroad purposes. I considered the cost of acquisition to be the value. I only made use of Mr. Riggs' results (except where

otherwise stated) as to land values.

I used three prices per cubic yard for earth grading: 20¢ for easy work in sand, 40¢ for grading at sink holes and soft ground, except on the new double track east of Negaunee, and 26¢ for other earth work. For loose rock, I used 50¢ and for solid rock \$1.35.

The quantities were considered in relation to the work. Sometimes the character of the material is not the essence of the cost; a fill of a foot scattered over long territory would be costly, no matter what material, while if 3 to 6 feet high it could be done cheaper.

This illustrates that the price depends upon a variety of things. The prices I fixed are, in my judgment, sufficiently high. It has been my experience that grading in construction could be

been my experience that grading in construction could be done for the price I fixed. In my judgment, the entire grading, clearing, grubbing, retaining walls, and rip rap could be produced new for the amount I have stated, or less. The amounts are \$2,442,311 for value new, and \$2,419,763 for present value (p. 37, Defts.' Ex. 15).

The average price of ties during the past five years, as determined from reports to the State Board of Assessors, was 33 cents. To this we added 7 cents to cover inspection, loading and transportation, making a total value new of 40 cents per tie. The 55% condition I use assumes a life for the tie of 7 or 8 years. Many of them are not good for that time. On the very best maintained railroads, where they use oak ties and stone ballast, we figure the average is about 75%; 75% of value new may be 100% efficiency. I do not say that fixing 55% condition is fixing the per cent of efficiency, because that wouldn't be fair to the railroad.

The wear on curves is on the inside of the outside rail and on the top of both rails. The tendency of the curve is to force the flange of the wheel against the inside of the ball of the outside rail. I would not expect to find any more wear on the inside rail than on pieces

of straight track.

I am now speaking of general conditions. A curve could be so sharp that the trucks of a freight car, which had been standing and had gotten stiff, wouldn't slew, and then you might find a wear on both the inside of the outside and the outside (inside) of the inside rail, but you wouldn't be apt to find it there; still it could possibly be some contact there; I would say practically no wear.

Q. That is on a sharp curve?

A. On a curve practically that you couldn't operate a passenger train around at all, but even on that curve the greater wear occasioned by that condition that I have named would be on the inside of the outside rail.

Q. Take where the outside rail is super-elevated and take a normal curve, not a sharp one, what would you expect to find there as to the

condition of wear; where would you expect to find it?

A. On the inside of the outside rail and the top of both rails; in other words, the cross-section of the ball of the outside rail would be diminished greatly in excess of the cross-section of the inside.

Q. Would you expect, or has your experience indicated, that the super-elevation of the outside rail causes a greater wear on the inside rail?

A. No sir.

- Q. Now, it has been stated in this case that the super-elevation of the outside rail causes a greater wear of the inside rail due to the movement of the freight traffic, in that the outside rail is elevated for the passenger service a little higher than that service requires; is that a true statement?
 - A. I would consider that it was not a true statement of conditions.

 Q. And you would not expect, then, the freight train in passing

around that curve, where the outside rail was elevated for the passenger service, to cause any greater wear to the inside rail than as if the outside rail hadn't been elevated higher than the requirements of the freight service?

A. I would not.

The Master: Can you see how there might be a difference of 700 opinion with regard to that?

A. No sir, it is a matter of fact; it is not a matter of opinion.

Q. Have you ever made any observations?

A. Many.

Page 133, Defts.' Ex. 15, Hansel, Ballast. In my judgment, ballast should be depreciated; I find the cost of ballast on the South Shore, exclusive of side tracks, to be: new \$667,807; depreciated \$560,480. I got at the amount of depreciation by its condition, and through experience that ballast is always in a depreciated condition, average throughout the road. They cannot ballast any considerable amount of the line at one time, because it has got to be done between trains; even if they set out with a ballast outfit on every section of the road, they would have to do it between trains. There is always a hiatus there when they cannot do that, and there is always a depreciated condition.

Ballast new is worth what it costs, if worth is to be determined by

cost of acquisition.

I have great difficulty with this term "value," and I am trying always to have hooked on to it some application. If the D. S. S. & A. property was today for sale as a going property and I was called in to tell proposed purchasers what they would have to spend to put that in hundred per cent condition, I would have to include something for ballast, and that something would be the sum I have set forth here, as near as I can judge.

The Master: Now, would you determine that by inspection or by some rule of depreciation, or how would you get at

that precise amount?

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A. I would do it exactly as I have done it. That is the only way I know how to do it. Ballast, in depreciating, increases in the value by solidification, and some percentage perhaps should be added to an old road for a certain purpose on account of the fact that it is old. and the ground is settled, but you would hardly feel, on the other hand, that they were to be taxed on that theory, and yet the intrinsic value of the property is increased by seasoning.

Q. The ballast might be depreciated to a certain per cent and still the ballast perform the office of carrying the traffic just as well

as if it were new?

A. Yes, if that per cent is maintained right along as an average per cent all over the line. Here I might have a hundred per cent adjacent to 25 per cent; to-morrow that 25 per cent is changed to a hundred, and the hundred begins to depreciate, and so on all along the line, it is constantly evoluting.

Q. When you say the hundred begins to depreciate, that means you are approaching, all the time, nearer to the point when you

must renew it?

A. Yes, that is it.

Q. And if it never required to be renewed, and would fully perform the office, then it could be carried at a hundred per cent, could it not?

A. Yes, but it must be, and is, renewed constantly.

Q. And if the South Shore were all ballasted new tomorrow, and you were making a report for purposes of purchase, that would include the element that you had a time ago of the
expenditure necessary to bring it to a hundred per cent condition;
you would not then include anything on account of ballast, would
you?

A. No. Q. But if, on the other hand, all of the ballast were five years old,

would you include something?

A. I would. That is because the ballast, having been in the track for a period greater or less, there must be some renewal.

Ballast is somewhat peculiar in its relation to upkeep; it is a neverending cost of upkeep of the track; there is no time in the working season, between the time of frost going out of the ground and the imminent danger of frost coming into the ground, that ballasting is not being carried on. Even in the very best conditions, there is a constant flow into the property of ballast all the time; it disintegrates, blows away, and settles into the embankment, perhaps owing to the character of the ballast, or, depending upon the character, it may settle into the earth beneath it, but other classes blow away and are carried away by the elements, so that there is a constant stream of upkeep there all the time, and yet it cannot be up to a hundred per cent.

The greater part of the depreciation is dependent upon the country, the climatic conditions and the ballast; stone ballast is not affected very much by weather conditions. On this railroad the sand would be materially affected by weather conditions—perhaps more by wind

than by rain; and gravel, not so much. St. Ignace gravel is good is good gravel; it enriches the roadbed, without any corresponding value. The seasoning makes a better roadbed.

All things that help to season it make it better.

On pages 234, et seq., Defts.' Ex. 15, in addition to the values fixed, I added percentages to take care of overhead expense of survey of the line, right of way, engineering, taxes, inspection of equipment and contingencies. All the items contained in the schedule have been considered and affected with overhead charges. All the overhead charges are computed upon other overhead charges; for example, the contingency item was included in the amount on which interest during construction was computed.

In Defts.' Ex. 15, beginning with page 234, I have treated in detail the subject of overhead and incidental expenses. What is there set forth was prepared by me and represents my judgment.

The first expense in railroad construction is the survey of the line, which in the case of the plaintiff would be comparatively uniform for every mile of road. On the other hand, the ratio of the cost of survey to the cost of construction would be above the average, because the graduation is light, and a survey conducted in the sum-

mer would be impeded by foliage. We have fixed the cost of survey by actual estimate at \$50,000. If we stopped there, it would appear that \$50,000 was the only item that was considered for the engineering cost, but, instead of putting on percentages, as is commonly done in the estimate of a prospective construction, I have analyzed each factor and tried to get at exactly what I would have

to spend for each of these various items, and to that sum we have added ten per cent for unfor-seen expenses. In my judgment, the surveying portion of the engineering cost

judgment, the surveying portion of the engineering cost could be done for the sum stated. We all know that there are no engineering difficulties on this line, and that any engineer qualified as a division or resident engineer would be fully competent to take the post of Chief Engineer of this particular railroad. In order to compute that sum of \$50,000, I constructed ten survey parties, and in that way, considering their compensation, subsistence and other incidental expenses, and in view of the ease with which the survey could be made, excepting some isolated cases, I considered that particular item, included in the total of engineering, would be covered very easily by \$50,000.

Such structures as are on the line would be designed by the bridge company; the organization for the survey and construction of such a character of road would not call for the services of a bridge engineer in the company's employ, because there are so few structures that he would have to design. I myself would send the bridge company the cross-section of the stream, and give a general design of what I wanted, and they would then prepare details and they in turn would be criticized by the chief engineer, but he wouldn't himself be apt to attempt to design those structures, which are in-

significant.

Q. Now, what other engineering costs have you found would

exist on the South Shore?

A. The engineering costs during construction, and perhaps after construction, so far as the equipment is concerned.

The Master: Better take it in sequence.

The country traversed is practically devoid of highways. 705 The first construction would be the building of telephone lines, to establish communication; headquarters would be established at various points, including railroad crossings, and the entire construction would be completed within two and half years. Construction could be hastened by employing a larger force and increasing unit prices. It wouldn't be practical, however, to attempt to open up the work on the entire line at once, as the quantities in graduation are not sufficient to induce grading outfits to come into the territory for short-time work. Two years and half should be the maximum time for any specific part of the road to be constructed in. It wouldn't be advisable to start construction all over the road at the same time, build certain portions of it, and throw it into operation just as soon as possible. While I have not said that I thought the entire proposition could be accomplished in two and half years, I would undertake to do it. The faster you do those things sometimes, the more economical it is, instead of dragging it along and fiddling. Two and half years would cover the interest charge on account of construction. That means that if they started it all simultaneously they could of course get it done very

much under two years and a half, instead of over.

On the Indiana Harbor rialroad, from the start of construction to the finish was a little over nine months, and we handled six million yards of earth in 110 miles, and we crossed 23 different railroads, which of course is an impediment to construction, because they don't allow contractors' teams to cross operating railroads, so we had to ship in the contractors' outlits, and unload at each of the several crossings, so they could work each side of the crossings. Those crossings also required safety appliances; we had to interlock all the crossings. I negotiated all the contracts with the various

railroad companies, and installed the signal apparatus, before any crossing of the senior company was permitted.

That was accomplished within the nine months.

Engineering headquarters would be at Marquette, with different residences east and west. Material yards would be established at Sault Ste. Marie, St. Ignace, Trout Lake, Shingleton, Marquette, Ishpeming, Sidnaw and Houghton; that would be the plan that I would use. It is estimated that ten field parties equipped for camping would be required during the entire period of construction, at a total expense of \$170,000. I would be very glad to undertake that contract for that amount of money. In addition to the above expense, the main office at Marquette, with two divisional engineers, would have to be maintained, at an additional expense of \$35,000, or a total for the field and office engineering force of \$205,000,

exclusive of the \$50,000 first above mentioned.

month, and I based it on the higher figure.

Without suggesting that the qualification of your divisional engineer is not such as would fit him for more difficult work, I would say that he would be fully competent to take charge of this as Chief Engineer; that is to say, if you wouldn't bring an engineer who from his age or experience or practice would cause him to demand \$25,000 a year, he wouldn't be as good as Mr. Cadarette at the salary he is getting, or I would hope some advance over that, so that I only speak of this to show that it is not high class engineering; almost any graduate one year in the field would be competent to supervise that. I fixed this in a lump sum, instead of by a percentage, because to my mind a lump amount does not signify anything, but if you analyze, as we now do in all construction accounts, the closer you analyze the more accurate you can be. Any given per cent is absurd, because five per cent on one road would be entirely in-

surd, because five per cent on one road would be entirely insufficient, whereas on another it would be entirely too high,
on account of the character of the work; there would have to
be more engineers on the building, for instance, of a line like the
New York, New Haven & Hartford, and they would have to be
higher class average engineers. All that a chief engineer here
would need would be a field party or field parties in charge of a
transit man, whom you could easily get at from \$100 to \$150 a

In a recent appraisal on the New York, New Haven and Hartford,

to justify securities that had been issued, an amount was fixed for engineering which, reduced to a percentage to compare with mine, was 2.2%. Percentage for engineering signifies nothing; you must know

the items it is on.

The N. Y. N. H. & H. is not comparable with the South Shore; it is a grand terminal railroad, with a most costly terminal and hundreds of junctions; there are 50 odd companies in the leased line, and each of them has to join on somewhere. This is illustrative of the fact that it is absurd to compare a flat percentage until you know what it is to be applied to. I don't think that this average percentage included the value of the land. The percentage of 2.2 seems to be the total allowance reduced to a percentage on the total value.

Mr. Butler: Yes, it is not the way it was applied. He takes the dollars allowed for engineering, and applies it to a sum including the value of the terminals and right of way, which would be a very very

large sum in this grand terminal, wouldn't it?

A. Yes, on that subject, and illustrating further why the New Haven is an entirely different condition is that the class of 708 patrons demand such a high class of service, and the public utilities have urged upon them very large expenses for the benefit of the public, and all of these expenses include very high class engineering; for instance, the New York connection over Hellgate, with the biggest arch ever constructed. It requires very much higher class engineering, and, in fact, in the appraisal of the New Haven by John F. Stevens, he thought it necessary to have two men, to each of which he paid \$10,000 annually, and the others in the same proportion, showing that he felt, on account of the great value of each item in the property, that they must get high class talent. The new Haven company has a great many tide-water terminals that are very costly, and under the Massachusetts law they have to eliminate a great many grade crossings, and they are doing it also on their own motion. That was an expense that is not found at all on the D. S. S. & A. The same might be said of the Pennsylvania, or any first class road, but the New Haven stands in a class by itself as to the cost of operation and cost of plant; therefore, the engineering per cent would hardly signify—it has to be analyzed closely.

I added for taxes during construction a general amount of \$50,000.

and 1% upon the real estate, making \$63,709.

Q. The contingency item; you have allowed something to cover that, and will you tell us how you arrived at the amounts that you

fixed, and what amounts you have added?

A. In the construction of a railway in a new country, where many of the conditions are unknown and frequently difficult to estimate, the engineer must make provision for these unknown costs. This is frequently done by adding a percentage to the total of the established

cost. Where the right of way and terminals or termini require the acquisition of costly lands, where the consequential damages are likely to be high, a considerable sum should be provided for contingencies. In the case before us, we know all the conditions, excepting, perhaps, I should have added the foundations of the retaining wall and some of the bridge columns, because they

were examined, and there is no important construction where the foundations are hidden, and in case they are we allowed liberally for such unseen foundations. We have estimated the extra quantities of graduation necessary because of sink holes and soft ground, and the quantities of graduation measured in the full prism have been increased wherever the condition of the ground has shown the necessity of additional material, as demonstrated by several years of operation. Now, those soft spots, a good many of them, would not have appeared in the construction or the survey of the road, especially in the survey of the road; the engineer wouldn't be apt to sound all of these depths, because it generally is done by the cross-section party, but the estimate has to be made before you can finance and before any cross sectioning is done. The waterways and bridges have been computed as they actually exist; therefore, there is no question of contingencies in the reproduction of the thing which has been built. further explanation, if any is needed, of that paragraph, I would say that the difficulty in a first survey is to decide upon the openings for water and for other purposes. Oftentimes it has been found after the road was in operation that their openings were insufficient. think, generally speaking, that is true, but, having built these and having had the experience of the openings and bridges necessary, the contingency so far as that condition has occurred is, I think, eliminated.

The ballast has been measured, as stated yesterday, as have 710 the ties and rails, and all stations and structures are fixed quan-Now, before you construct, you cannot imagine properly all of the buildings which you would have to have in your final operation, but, having these now before us, we know what we have got to produce to make an equivalent of the present construction. Shrinkage has been allowed for embankments, and in taking profile measurements care was exercised to favor the greater quantity. I was particularly concerned about that, and gave instructions that they should be called off from the profile by two different persons, at different times, to check up any error, and always give the measurement in favor of the higher quantity instead of the lower. In view of the care with which the elements have been separated, measured and considered, we do not feel that an allowance of more than 10 per cent should be made on the following: Grading, Sidetracks, Shop Machinery and Tools, and Engineering. After having added on those items, as before stated, for engineering, we again add ten per cent legal expenses, organization and general interest and taxes, furniture and fixtures and stores and supplies. To all of these items has been edded ten per cent after having in graduation; for instance, included quantities that did not appear in the prism but were assumed to have been used in the construction, and after adding very heavy percentages to some parts of the road, in order to determine the final quantity, we then again add 10 per cent to cover any possibility.

Q. Now, why would not such a contingent allowance be necessary

on such items as ties and rails?

A. Because they are capable of being accurately determined.

We did not count all the ties, but counted typical sections and then took also the standard of the railroad company into consideration as to how many ties they expected to keep up in each mile of track, so that the rails and ties are not subject to contingencies as long as you know the distance which you have to cover—the miles of route.

Q. The method of your ascertainment of those items, for example, ties, is equally accurate for practical purposes as a count, is it not?

A. Yes, I think so. It is hard to vary the number of ties in a given length of rail, because, even if you desire to get more ties in than 16 or 17 to the rail, it wouldn't be policy to do it, because you have got to get between the ties with your tamping bars, and if you

get them too close you couldn't tamp up the road.

Throughout the entire line there are no conditions which invite legal troubles, except through Negaunee and Ishpeming; a small legal staff acting with a right of way agent would have no difficulty in handling all legal matters. In addition to the \$20,000 provided for right of way agent, we think that \$50,000 will cover the legal expenses, making a total of \$70,000 to cover the item of acquisition of right of way and the legal expenses incidental to any other feature of construction.

It is impractical to determine the office cost of acquiring land by using some per centum of entire cost of the road. The right of way is through a very thinly settled country; much of the land is held in large tracts, and in our estimate of cost to acquire we have added at least a hundred per cent to the normal average value of the rural land in each county. We believe that, with the D. S. S. & A. obliterated, if we were given the task of acquiring a right of way, much of

the land would be acquired free of cost; rights of way and additional lands are acquired by operating railways in States where land values and consequential damages are much greater than in the Northern Peninsula of Michigan for not more than 25 per cent in excess of the normal value. We are required, however, to determine as near as practicable the sum that is necessary to produce certain property. It is a suppositious case, and we feel that all coubt should be resolved in favor of contingent or unforeseen expenses; with these conditions in mind, we have included in the overhead expenses a sum of \$20,000 to cover the expense of the office, the field force and the right of way and land agent. That, added to your \$50,000 for legal expenses, makes the \$70,000 that I included under Legal Expenses.

The organization, drawing mortgages, etc., will be done by the legal department, the printing of bonds and stocks and the general administration over and above the engineering and legal expense should not exceed \$100,000. I consider that a very liberal figure. That is an arbitrary figure. You couldn't figure a percentage. It is better to have as much analysis as you can, I think, of all these

items.

The \$100,000 was just my opinion; you couldn't analyze it; nobody can tell how much you are going to pay for the printing of bonds or stock until you have them printed, or the cost of drawing a mortgage and of supervision. I don't see how anybody could do anything more than say, well now, with such a force for a period of time—I do analyze it to a certain degree, by going over those features—such a salary, the head of the department and his aides would be perhaps such as a superintendent of construction, after the operation had partly begun, until that time construction

should be in the hands of the chief engineer, but there is in the handling of construction trains, as soon as you get up to that point why you are out of engineering department and into the operating department, but it has been the fashion to keep up that construction account as long as they could, and many of the railroads in the country have been seriously handicapped by that construction account because that was a common dumping ground for anything

the promoters saw fit to dump in there.

Q. You have added by way of interest on the investment during construction; will you give us the methods at which you arrived at

the amounts or percentages added, and the amounts?

A. The financing must provide for interest on all disbursements during construction. This interest must be paid, not only upon the actual money expended, but upon the face of the securities hypothecated to secure the money; construction bonds bearing 5% cannot be sold on better than a 6% basis, or about 85; it is impossible to precisely determine the amount of interest chargeable to construction, but it can be fairly approximated, and I have endeavored to analyze that feature as follows: The first important item is the right of way in lands; upon this item, interest at 6% is allowed for two years, or 12% in total; items 3, Graduation, and 5, Bridges, Trestles and Culverts, may be fairly considered as evenly distributed throughout the entire period of 2.5 years, and on these items we allow interest at six per cent for 1.25 years, or 7.5% on the total under schedules 3 and 5.

Item 6, Ties, will be purchased as soon as possible after construction is determined upon and paid for when delivered on the line. The number of ties required would necessitate shipments from

outside, which would possibly be received at railroad crossings, where tie yards would be established. The average time of purchase would not exceed 1.5 years, and we have allowed 9% on the purchase price of ties. Items, 7, Rails, 8, Track Fastenings, and 9, Frogs, Switches and Crossings, are put down last, but in order than no delay may occur, these materials should be delivered at the various yards in advance of the time the roadbed is ready to receive them, and on these we have allowed 6% interest.

Item 11, Track Laying and Surfacing, is figured 6%, and Item 10, Ballasting, should follow track laying immediately, so as not to kink the rails. The expense attendant upon these two items should not cover a period longer than one year, and, to provide for the interest charge, six months' time has been taken for the average, or

3% on items 10 and 11.

Item, 12, Fencing, is the last item constructed, ordinarily, and is generally left until the road is open for operation, when men and materials can be conveniently transported. We have allowed three

per cent on this item, as on 13, Crossings, Cattle Guards and Signs,

and 14, Interlocking and Signal Apparatus.

Item 15, Telegraph and Telephone Lines, is one of the first expenses, and on this we have allowed 12%. Item 16, Sidetracks, are built partly during the time general construction is going on and partly after the line is in operation. An allowance of 6% has been provided to cover interest on this item.

Items, 17, Station Buildings, 19, Shops, Enginehouses and Turntables, 22, Water Station, 23, Fuel Stations, and 28, Miscellaneous

Structures, are built after grading is completed, and are not generally finished much in advance of the line. They are generally delayed until we can carry the material on cars. Materials must be purchased in advance, and an average of six months consumed in construction. To cover this interest charge, 4% has been allowed on items 17, 19, 22, 23 and 28.

Items, 20, Shop Machinery and Tools, and 18, Construction Tool;

Items, 20, Shop Machinery and Tools, and 18, Construction Tools, are allowed interest at 3%, to cover the average time on hand before the road is opened, and, of course, in machinery you always get credit if you ask for it, 30, 60 or 90 days, especially if you are buying an

amount sufficient to accommodate the whole road.

Items 26, Docks and Wharves, and 27, Electric Plants, are among the last items to be built, and none of these structures will require more than one year to construct. To cover interest, 3% has been allowed.

Item, 29, Survey and Engineering Supervision, will continue throughout the work; an interest charge of 7.5% has been provided.

Items, 30, 31, 32 and 33, Equipment, is generally purchased through an equipment trust agreement, outside of the construction equipment, which is provided by the contractor or taken care of in the unit prices allowed for cost of construction. No equipment is required until the road is put into operation, and generally the first interest coupon doesn't become due until six months after the equipment is received. So no interest charge has been allowed for equipment.

Interest is allowed on schedules 35, 37, 38 and 39 at 6%. The largest expense will be during the latter part of the work, consequently a rate of 6% on total expenditures will fully cover interest

charge on those schedules.

716

Q. Would the money on the bonds all be turned over to the railroad company at once, or would the bonds be turned over

as the money was needed, as a matter of practice?

A. I should expect to turn over bonds to the bank as I hand vouchers to them to pay, as near as may be; I would always have to give somewhat more in the bonds than the actual monthly pay-roll would call for, or monthly accounts. Of course, if the whole sum was to be borrowed and deposited in the bank of the company who was financing it, it would be very good financing for the banker, but very poor for the railroad, and I wouldn't consider that that would be done.

Engineering on Roadway and Structures, including the survey, \$255,000; Engineering on equipment, \$61,042; Contingencies,

\$479,735; Legal Expense, \$70,000; Organization and Administration, \$100,000; Interest, \$745,349; Taxes, \$63,709. In each of these, the value new and present value are the same, none being depreciated; in my judgment, these amounts are sufficient to cover the expense of

these items. For the entire South Shore property, including every item noted, the total value found by me is: cost of reproduction new, \$15,531,227; Those are my final figures for the value present value, \$12,596,114. of the physical property, including an estimate of \$100,000 cash for working capital, but not including the property of the Mackinaw Transp., Soo Union Depot, or Soo Bridge, Companies.

My value, before addition of overhead charges, is:

717	Value new.	Present value.	
Physical value before overhead charges	\$13,756,392 12.9% 1,774,835		
Adding Overhead	\$15,531,227		

I did not follow the practice of taking the flat percentage of each item of overhead cost; I attempted to deal with the case as it existed. I have never believed it proper to assume the same percentage on the items for overhead charges, as these items vary so greatly in different properties. The description of the subject of overhead and incidental expenses is set forth in detail in Defts.' Ex. 15, pages 234, et seq. I feel that my judgment in the consideration of the definite items of overhead percentage is productive of greater certainty and accuracy than adding a flat percentage.

I added for Stores and Supplies: value new, \$280,059; present value, \$280,059. This was divided between states on the basis of

track miles 82.9% to Michigan.

Those are taken as of June 30, 1912; we did not go back over a period of years, but simply found what was then on hand; they might have had more or less at a previous time.

The \$100,000 for Working Capital was purely arbitrary, based on our opinion; this is a fair amount; they may have had \$50,000, or \$150,000.

(It is understood that the text of Defts.' Ex. 15 shall be 718 treated and considered as the witness, Hansel's testimony.)

It is my judgment that on Oct. 1, 1912, the South Shore property in Michigan devoted to railroad use as a whole could have been constructed, the right of way being acquired and structures put there, for the figure stated as my value new (p. 4, Defts.' Ex. 15), \$15,-531,227, or less.

The present value of \$12,596,114 represents my judgment of the present condition or value of the property on Oct. 1, 1912. term "present value" is intended to convey the value new as depreciated by the elements or use or obsolescence, and has nothing to do with sale value; it might be the same or different.

In my opinion, the property would not be worth any more at any time in a period of three years preceding the date of the inventory,

meaning the present condition or value.

As bearing on the item of Interest; it is the practice of railroads to hold back from the contractors generally 10% or 15% of the estimates. I cannot answer whether that would affect the item of interest; the contractor would consider that in his unit price, if he is wise. In fixing prices, e. g., grading, a contractor making a bid should, and does, so far as he is able, consider the contingencies which he is required to assume. The only place he can put them is in the unit prices. The prices he charges is the measure of what he is going to get out of it, including his profit; those prices include

everything, except contingencies by way of quantity, because quantities are developed as the work is done, consequently

most contracts are based on unit price.

If South Shore were to be reconstructed in entirety, the amount of grading and work required would not be such as to produce any considerable increase in prices of labor or material; it would if it had to be done in six months time, but, under ordinary conditions of construction, taking, say, 2.5 years, it would not. Nothing was allowed in my unit prices for advancement of labor or material due to the demand from reproduction. On Indiana Harbor Railroad, where grading was approximately the same as South Shore, construction was completed in 9 months. I had no intimation that prices increased; the contractor took it at a fixed amount, and seemed to be satisfied with his contract; we had no trouble getting bidders there. I was the consulting engineer.

720 HANSEL.

Cross-examination.

By Mr. Butler:

Defts.' Ex. 15, Hansel, page 17, item 1, 6.3 acres: Riggs' value, \$2,500 per acre. I reduced that valuation to \$2,000, because of abandonment of certain developments going on at time of Riggs' appraisal, because there was no growth of the town that way, and because I considered \$2,000 an acre a very fair price, higher than I would expect to purchase it for; I never bought land at Soo, nor did I ask any person other than Tombo about its value there.

My opinion was \$2,500 an acre was high for that land. The improvement on tract 2, (Defts.' Ex. 18, Hansel) had been abandoned; they had taken up the track and were not doing any more filling, the idea being that if there was demand for that character of land the improvement would have been continued. There wasn't any

evidence of any development or any demand for that land.

As to parcel 1, on Defts.' Ex. 15, priced at \$2,000 per acre; if I had only made the trip to Soo, referred to, I would not be qualified to

give any opinion, but I have had occasion to value property in various states for various purposes. So far as I know, no person is qualified to say precisely what the value of land is for railroad use, especially at a terminal; so many elements enter into value that the value of land for the precise purpose for which it is to be put is entirely a matter of opinion, and cannot be proven. My figure is the estimate I would give a client, based upon knowledge acquired in many years of work.

721 I had before me the statement of Mr. Riggs, but, because the town was not growing in that direction and there was no demand, I would certainly expect to buy cheaper than his values; I saw the testimony taken in this case on the value of real estate at the Soo; I was influenced by everything that had bearing on value.

I did not examine the testimony of the witnesses as a judge; I mean that I had the value fixed upon that by Mr. Riggs at the time that he fixed the value; I also had the value given in the testimony, I don't know who by, of various tracts of land in the vicinity, and I had my own observation of the character of the land and the fact that there was no development going on in that section; I considered the value given by me to be as high as I would expect to pay if I were to build the road.

Mr. Wykes: Mr. Hansel's testimony all through, I think, indicates that his investigation was rather superficial as to land values; that is, it is the judgment of a man of experience, not acquainted with the detail. I am going to produce the detail for you.

I understood that there were to be so-called experts on the land employed by the State and therefore I wasn't expected to go into it in the same manner by producing sale values and trying to

apply them, as if those experts were not to take up that subject, consequently, I put upon the land the values that I would expect to have to pay if I was called upon by the State or by an individual to give him an estimate of the cost of building that road, and I certainly feel that the investigation was sufficient for that

purpose.

The area of the 100 foot strip, item 8, included in railroad use is about 2.5 acres; Deft.'s Ex. 15, Hansel, item 8, shows 3.4 acres at \$1,000, or \$3,400; that is the price for the land in 100 foot strip, in the triangle of the wye. I don't think the balance of triangle worth that per acre; I didn't estimate that; not included in railroad use, it would be worth under a thousand dollars an acre.

I formed an estimate of the lands inside the wye, in view of severance damages, which is higher than the whole tract; I should say \$600 or \$700 an acre for whole tract without the railroad on it as the highest estimate.

The remaining land is high priced farm property; that is all. It is not city or suburban property in any sense of development.

The value put on such portions of right of way and station grounds as shown in schedule were the values considering all elements I thought should be considered in acquirement; this includes expenses of acquirement and element of cost on account of forced purchase

and the fact that seller asks and gets a higher price because of the necessities of the railroad.

723

Generally, the railroad has to pay more for land than true value; sometimes it doesn't pay anything. The excess is sometimes as high as 200%, and sometimes more; I always had the cost of acquisition in mind.

I had the testimony taken with reference to values at Soo. I didn't give much weight to Stradley's value of \$1,500 per acre, on item three, for ordinary purchase and sale. It didn't seem to me to be the testimony of a person whose judgment I would accept.

Deft.s' Ex. 19, Hansel, St. Ignace, 2400 ft. dock property, #16; Riggs' value, \$10 per foot, \$24,000; Hansel, \$15 per foot, \$36,000; that is just my opinion of the value. I saw Riggs' figures before I fixed my valuation at \$15. Had no data except my examination, notes and experience. I presume we had all of the testimony at time we fixed that value; am not sure. I went over such testimony as was furnished me, spending 4 or 5 days going over it. I made memoranda as to this property on trip of Aug. 5, 1912. front between the steamboat pier and ore docks seems to be of very small value, has shallow water, and there would probably be no demand for it for any purpose except it be the building of a pier or a dock, and no connection can be made with such pier or dock except by tracks in the street, or through the street.

I don't think I was influenced here by the testimony of Hoffman and others; I don't recall that feature of the testimony.

724 Deft.s' Ex. 20, Hansel, at Carp Furnace, South Shore crosses Carp river in northerly and southerly direction, being a mile from city limits of Marquette. The line follows the lake shore, and, generally, the land on the left or westerly side is fairly high ground up to the crossing of Carp river. On the north side of Carp River and east of the furnace, the line swings to the east over the highway and along east side for a considerable distance. The bluff northerly and southerly of Carp River and the configuration of the ground is such that a railroad approaching Marquette from east, to get a reasonably cheap location, must be close to lake.

That a railroad approaching from east must be between bluffs and the lake renders the property more valuable, because of necessity of use for railroad purposes, than if it were an open stretch of country; not only is the land more valuable for railroad purposes, but because owners would put a price upon it taking that into consideration. valuing the road through Marquette, I attempted to take into consideration all of the elements which I thought would affect the prop-

erty's value.

If you had to pay \$100 per front foot for the land along the lake shore, valuable on account of riparian rights, I am not at all sure that it would be cheaper to acquire that land than it would be to attempt to go around to the city of Marquette from the east 725 through the hills or bluffs that I have referred to. I believe it would be cheaper and better to take the upland elevation;

I would have to study that to be sure. If we were to assume a

reasonable price to be \$35 per front foot for the land abutting on the water on which to construct the road between the lake and the bluffs, it would certainly be cheaper to go up on the hillside than to pay that price; I suppose to do this it would be necessary to go up onto the hillside as far out as the city line, in which case the distance would be 1.5 miles at \$35 a foot; this would amount to \$277,000.

You do not necessarily have to go around the bluff, but you would go on the side of it. I have not figured out at what point you would get down to the lake level; it would be ultimately necessary to get down there, but not of necessity with the main line. I might be higher up with my station in the city and come down to water front with a heavier grade; I presume we would have to come down the front to get to the water.

To get into the best part of Marquette would take 2 miles further, or 3.5 miles, which, at \$35 per foot, would cost \$470,000 for right

of way.

I mean it is 3.5 miles from city line to Marquette station, according to mile posts. I decline to testify as to the difference between the cost of that and a railroad built on the bluff, because I don't

know until I survey it; it is my judgment that it would cost more to come in on the lake front, at \$35 a front foot for riparian rights, than to go up on the bluff in some way. I am satisfied that, adding the cost of construction down there to the \$35 a foot, you would have a higher figure than you could buy the right of way for, adding cost of construction, inland. At \$35 a foot, right of way would cost \$155,500 per mile, exclusive of other items; I have no idea that right of way inland would cost anything like that.

I don't know what railroad construction inland would cost; all I can say is that my opinion is that, at \$35 a foot for the riparian ownership or rights, it would be cheaper to come in there. That is a fact I could only determine on actual survey. Ultimately you must come down from the hill to the lake shore, but not of necessity with the main track; I don't know how you would avoid coming to the lake shore with the main track and get into the heart of the city; I have not surveyed it. The question of relative cost is entirely speculation and guess work on my part; I have not been asked to prepare myself on that subject at all.

Item 31 (pp. 19-20, Deft.s' Ex. 15), 1,100 feet water front: Riggs' value, \$35 per foot; Hansel's value, \$1 per foot. The railroad owned, but did not use, the water front; I didn't class it as railroad use, and gave it a nominal value. I found no riparian use of that

The only value I gave to the riparian use is value for piers or docks. I found that there was rock thrown down there to riprap the track and protect it from the water; I found the riprap in use and have given credit for that. If there had been any construction there out from the shore, I would have included it as railroad use. The riprap is not of that value; that value is beyond the riprap. Any value given for that purpose is beyond the riprap, under water. The \$1 a foot is just a nominal value for railroad use. If you occupy all of land to water's edge, there is not a riparian use of the property.

Land is often bought for use as upland, without buying the riparian rights; you can put a building on it without destroying the riparian rights, or sell it to somebody else to put a dock on, giving right of way over the land to get off the dock, in this case over or under the railroad track. That is often done. It is no good to you unless you want to put a pier on it; that is often done; you hadn't devoted the riparian rights to railroad use.

I don't think you have turned the entire property to use. I can cite many cases where they buy to the shore and do not own the riparian rights at all; it is often the case. I think we found riprapping at that place, and that it had been necessary to riprap other land each side of that, to protect the track. I undertook to separate the land from the appurtenant riparian rights, and to value it in that way; I

frequently do that in valuation. Often, they do not own the 728 riparian rights at all, because it costs too much for the purpose of upland. I don't know, but I should say that 1,100 feet strip is 50 or 60 feet wide. I would suppose that that could be bought without compensation for riparian rights; if I was the rail-

road I wouldn't buy the riparian rights there.

It is my judgment that for \$1 a foot I could buy that 50 or 60 foot strip of land 1,100 feet long, and separate it from its riparian rights. There is no valuable use of the riparian rights other than putting structures on them; I can imagine a person might want a dwelling above it with his view unobstructed by docks or railroad sites. property is platted up to the street adjoining that strip. That is easy to do, of course; that don't give it value, just to plat it. I believe you could purchase that 1,100 feet for \$1 a foot, because there is no apparent demand for it other than for railroad use, as now used. lieve I was furnished the testimony of Asire and Robertson.

Along this 1,100 foot strip, the railroad, in a sense, damages the

surrounding property.

I was not asked to determine the cost of it at the time of location In getting production cost of the land, I assumed of the railroad. the existence of the railroad; I proceeded to value that piece of land under the conditions existing today, showing there was no demand for the frontage for any purpose. When called upon to get reproduction value of railroad property, you must not take into considera-

tion damage that was done residential property in its acquire-729 You take it as the conditions exist today; it has been damaged from some cause or other; the value of it is as it is.

We allow nothing for severence damages in our estimate, because, on the other hand, where it has appreciated beyond the cost of the land at the time it was purchased, we gave credit for that unearned We didn't consider what it cost when they built it; that increment. was not our problem.

I didn't consider the value of the adjoining property at the time they built the railroad; that property may have been higher in value at the time they built the railroad than it is today. On the other band, in some other case, the unearned increment has increased the value of the land over and above what it cost to build, in which case

we considered the increase or the conditions that obtained at the time

of the survey.

In taking the parcels I considered them as irregular parcels and of the shape in which they would be required, as purchased. I took the several parcels as owned by the railroad and endeavored to fix a value as of October, 1912, taking into consideration all elements.

Understand, if the Court please, that all of this whole thing is suppositious, at the best; it is hypothetical, and because of those elements it is necessary to exercise your judgment as to all the elements of cost that would come into the acquisition of the land at the time you are considering it, and to say just exactly what weight was given,

or if any weight was given to any particular item, in all of the cases, or in any particular case, I am unable to say. 730

The Master: According to what you have just said, you did take into consideration abuttal damages, if you took any of the elements that would enter into it.

A. I endeavored to.

The \$1 per foot is based upon my opinion, the opinion being based on experience and conditions and the evident fact that there was no demand for that frontage other than for railroad purposes. There is not a dock anywhere south of the city, except the Standard Oil pier. There isn't a pleasure boat anchored anywhere, or any evidence of any desire to use the land. Had there been piers-even small onesowned by the owners of the upland, to get to that water for pleasure or business, I would have considered that, but there is absolutely no occupancy and no apparent object in using that portion of the bay.

I cannot give a supporting figure for the \$1; it is simply a matter of opinion, based upon my experience. I could find no evidence that this property had any riparian value. In my valuation I don't consider whether there was any value to the riparian rights; I have never, until today, seriously considered the value of the riparian rights.

Q. And yet you answered the Master today that, because you couldn't see any docks or pleasure boats, it didn't have any value? A. Well, I wasn't discussing that particular situation, but

all of this, I said, if you please, the whole frontage south of 731 the oil pier there was unoccupied, and I did not consider that any of it had any particular value for the purposes of riparian rights, and I still say that it is not used by the railroad in any sense of railroad use.

I've valued riparian rights and upland in property on p. 18a, Defts.' Ex. 15, Hansel, reaching a value of \$53,750, as against previous value

of \$62,500.

I think my item 33 is the same as Riggs' second item, 2,200 feet

inside Marquette harbor.

Our valuation is divided differently; the value of approaches for ore cocks 4 and 5 is my opinion, taking conditions as I found them; I l ave had experience elsewhere and considered the conditions and the development or undevelopment of the harbor, 100 feet of the dock approach is on east side of Lake St. For the purpose of dock approach, I could see no difference between east and west sides of street, and fixed a price for any purpose of \$25 a foot.

Q. Did you in any way consider severance damages?

A. I attempted to consider all the elements affecting value, considering the ownership of the adjoining lands had an affect on value. Item 34, Defts.' Ex. 15, frontage west side Lake St., north line Ely

lot to Jackson St., 1,000 feet; valued \$30 a foot; it is of greater value than the item under 33, of 100 feet just referred to. 732 value of \$30 was my opinion, considering the size and depth

of the plat and the conditions; all the values were made on I inquired of no outsider as to the value or sale prices

of real estate in Marquette.

The only information I had was the evidence in this case and my personal opinion after going over the entire situation. I examined each parcel, and, so far as I was able, made comparisons of the cost of acquisition, having all the elements in mind that I could bring to bear on the subject. I considered all the testimony I had before me, and judged partly from that and partly from my own observation, I presume.

Item 34, p. 20 Defts.' Ex. 15, frontage west side Lake St., north line Ely lot to Baraga Ave., \$15 per foot. Rejected Riggs' value of \$30, because the configuration of ground depreciated the value; the ground rises very abruptly, and must be excavated to be occupied for any purpose. It would not be considered for the purpose of resi-

dences.

In reducing the value of Riggs', Asire and Robertson 50% on this I endeavored to carry out the sense of proportion between values, meaning to consider the depths, availability, and all the elements that go to make up the value of a tract; some of the land is valuable because of its use for a variety of purposes, and at other points there are fewer purposes for which it could be used, therefore there is a proportion between the two, in the variety of applications of industries or other earning organizations. On 34a, there is a very shallow frontage. The upper end is used for a park; there

733 would be a very small demand for that tract for anything but

railroad purposes.

All of the land is for railroad purposes; I don't estimate the value for that purpose. All the land occupied is valuable for some purpose; to take out a part of the track would destroy the continuity of the rails, consequently one foot is just as valuable for some purposes as any other foot. Where there is a narrow strip of land between a high bluff and just room enough for a yard, with no other land in the vicinity that can be put to use as a yard, that land has a special value for railroad purposes; I never gave it such value, because it cannot be estimated by anybody that I know of, e. g. there is no price railroad terminals could afford to accept, if continuing in business.

If they were deprived of their terminals and could not acquire others, there is no price they could accept if they expected to continue in business; there are very few pieces of land that I could estimate in dollars and cents as value to the railroad. In some cases they would vary the route, and in others they could not, that gives the latter a special value, which I cannot estimate in dollars and cents. Yes, I think I can go into Marquette and estimate the value of property, without finding the holding or sales value. I cannot, however, estimate in money the special value for railroad use. I can see a difference in the value to the railroad and the value of the land.

Q. Is there none of this land that had a special value, this land along that lake front, because it was the only desirable practical route into the city of Marquette, and very limited in extent, so that the owner would be justified in charging higher price for it than he would where there was a vast quantity of it, and

the railroad would have to pay a higher price?

A. I think we have considered those elements.
Q. You have considered all of these elements?

A. In all this valuation.

Item 35, Defts.' Ex. 15, frontage west side Lake St., Jackson to Mesnard, 565 feet, value by plaintiff's witnesses, \$20 per foot, by Hansel \$10; that is my judgment of the value.

Item 36, Defts.' Ex. 15, frontage west side Lake St., South of Hampton St., 170 feet. In valuing this, I applied same considera-

tions as to all other places.

Item 37, 46 50-foot lots, between Mesnard and Hampton Sts., present a problem of valuing city property. I estimated the value by the surrounding conditions, and evidences of development or lack of demand, whichever seemed to exist. I spent more than 2.5 days' time in Marquette, and, besides that, had evidence through my assistants, through the testimony, and the observation of the ground; in that valuation I was somewhat influenced by the testimony. I fixed those values myself, in consultation with my assistants.

Item 38, 12 50-foot lots; \$200 was my estimate of the value of that

group.

735 Item 41, frontage on Front St., Baraga to Washington St., depot grounds, 343 feet; the Front St. end of the 40 feet thoroughfare is also here rejected, leaving 303 feet. For the remaining 303 feet, my value of \$400 per foot is my opinion, after studying all the conditions and data and such evidence as I had.

Item 42, 184 feet frontage on Front St., south of Baraga; I based my opinion there upon the character of the ground, the buildings opposite and the conditions surrounding; it was my judgment, based on my knowledge of the location, together with such use as I made of the Riggs' valuation and the testimony of witnesses furnished me.

Item 44, 14,000 sq. feet in Alley east of Third St. Riggs' valued 14,608 sq. feet. Our areas were checked. I fixed price and arrived at it in the same manner as the last preceding. Also valued all property frontage on business streets and where lots are involved in

the same way.

In reducing Riggs' price on 14,000 feet from \$2 to \$1.50 per square foot, I have no recollection of the reasons, except the configuration of the piece, it being an alley, influenced me in placing \$1.50, which is fairly high; I did that in spite of all testimony. That is a situation that is entirely a matter of opinion; it is an alley, back of lots fronting on Washington and Main Sts.; there is no sale value

for that kind of property, and no demand for it except for railroad

You could only determine what the owners on Washington St. would be willing to buy at from an actual offer. To get at a precise value we would have to assume that railroad was not there, that town was same size, that there was demand for the property on each side, and then go to each owner and find out exactly what he would sell for. If it were attached to the rear of lots on Washington St. I should expect, on condemnation for railroad purposes, to get it at the price fixed; \$1.50 a square foot is no small sum of money.

Item 45, Defts.' Ex. 15, equivalent of Riggs' 100 foot frontage on

Baraga Ave.

Item 46, equivalent of Riggs' 150 foot frontage on Spring St.

Item 47, Third to Fifth Sts., 3.5 acres, at \$3,000 per acre; the

same as Riggs' 21 lots Third to Fifth Sts.

Item 48, Fifth to Park Sts., shop grounds, 15.5 acres at \$2,000 an acre, is same as Riggs' 60 lots, shop grounds, Fifth to Park Sts., \$500 per lot; agreed with Riggs on latter two items, on same theory that in other cases I could not agree with him, basing my values upon conditions and investigation.

Item 49, corresponds with Riggs' 34 and 36 acre tracts south and

west of Nester's Add.

As to Riggs', Robertson's and Asire's value of the tracts aggregating 70 acres at \$900 and \$1,000, I felt that if I was correct in throwing out the considerable area on account of non-railroad use, I could not consider any estimate on the sphale. I likely the sphale of the sphale o

could not consider any estimate on the whole. I didn't come to the conclusion that the whole was worth more than they fixed on it; for railroad uses, the excluded area between the tracks would be worth as much as the land that had tracks on it. It would not be valueless for other uses; it would be an excellent place for an industry, if there was any demand. The piece on the south is more desirable for dwellings than for any other use; it is hardly accessible to the railroad, and is good high ground, suitable for cheap dwellings. The existence of the yard parallel to, and within 200 feet of, Washington St. lessens value of land there for high class dwellings.

Item 52, north line right of way to city limits of Marquette, 6.8

acres, \$200 per acre; this is my opinion of the value.

Item 54, south line right of way south of Division St., to north line S. W. ¼, of S. W. ¼, Sec. 26. 4.1 acres as against Riggs' 16 acres; our value (\$200) is the same as Riggs' for the acres included. Our value includes nothing but the 100 foot strip.

We didn't adopt Riggs' value; I didn't disagree with him, because I didn't consider the whole area, but only what we were appraising.

(Strip, about 1,400 %eet, from No. 54, on Ex. 20, to platted portion of city, omitted from Hansel valuation; it is something between 3 and 4 acres.)

738 Item 55, 96.4 acres: the value on that strip of land varied; I estimated the average at \$75. We were over that part of the line on other occasions than our first trip. The character of

the land is easily observable, whether tillable or timber, underbrush or swamp; it is easy to see from the end of a train, oftentimes easier. Land untillable in present condition, lying close to a town of 13,000 people, may have a value beyond that of tillable land further away. This is between Marquette, Eagle Mills and Negaunee. The notes indicate this is on the side hill, not suitable for farming, and very cheap character of land; I consider \$75 an acre high for it.

Item 53, north line of city limits of Marquette to mile post 163;

90.3 acres, as against Riggs' 79 acres.

Item 56, north line from mile post 163 to mile post 164 plus, 4200 feet, and south line, mile post 9 to mile post 3, acreage 86.5, divided into two tracts, one 46.5 acres and another 40 acres. (Witness indicated division between these two tracts, one being at \$1000 and the other at \$3,000 per acre by pencil line on Defts.' Ex. 21, Hansel.) The division is approximate, as it could not be absolutely correct; we could not go a certain distance with an acre at \$1,000, and then suddenly change to a value of \$3,000 an acre. The intention was to separate the potential ore values from the developed and operated ore values; the line is somewhat of an imaginary division between the two qualities of land, but generally

shows the division. I am putting the black line on from

739 memory of the situation.

I instructed Mr. Tombo to get together all the information he could on the subject of these land values, after which we consulted together, and I determined that that would be a fair division between the developed and undeveloped ore bodies; to determine that with any accuracy would require surveys of the ore bodies, which I did not do. In giving these values I considered how much I could get into that territory for, in the same general location, if I could get in at all. It might be that, with value of the land as held by the owners, it would be absolutely prohibitive to build a railroad in there

It would depend greatly upon the attitude of the owners of the land, which I could not determine; if they had to pay over \$3,000,

it would cause great hesitancy in building there at all.

There are so many conditions affecting value there that I don't understand myself, I frankly say it, that I haven't found a definite explanation of, nor have I seen any condemnation proceedings or court proceedings on this area that we have under consideration, that it was in my mind a matter of judgment as to the value or the amount we would have to pay for the surface; I didn't attempt to estimate the value of the ore underneath at all.

I determined it to the best of my ability; spent but a short time on this investigation personally, probably not more than a day on the ground, and going and coming. We stopped at Negaunee and

Ishpeming, went slowly over the roadbed, and over the station grounds; was not on old line at all, but could see it full of cars, and got a general view of the surface; didn't attempt any estimate of values under ground, but I had all the information available at the time. I didn't intend to say that anything above \$3,000 would be prohibitive, but that it is quite possible that the conditions of ownership could be such that the price you would have to pay would be prohibitive. We had the testimony of Mr. Riggs and I saw testimony giving results of condemnation proceedings in the immediate vicinity. I observed that Belden and Young put a higher value than Riggs, and supported their judgment by accounts of actual purchases and sales. I don't recall having before me the prices actually paid for the new line, 2.6 miles; I presume that we did. I don't think it would be right to value the land at less than cost to the railroad, unless they had intentionally paid more than they could have gotten it for.

I think if a piece of property is purchased in good faith, and with reasonable intelligence, as I presume this piece was, that the company would be perfectly justified in carrying it in its assets at what it cost them, but, as a general principle, I think we should hesitate to formulate any theory on the subject, because conditions may change very quickly, and, if you care to have me, I will illus-

trate.

I cannot give the name of any person of whom I or my assistant inquired about these values. My assistant expressed an opinion as to these values to me; I always ask. I cannot say whether I adopted his opinion or my own; if I had formed an opinion in advance, there would not be any object in consulting.

The conclusions I came to are my own.

Item 57, Riggs, \$3,500 per acre; Hansel, \$4,000. I think Riggs' figures were as accurate as could be determined under all conflicting conditions, and, because of elimination of a certain area further from center of Negaunee, the balance would be at a higher average per acre. Having adopted Riggs' basic value of \$3,500, the rejection of 5 acres induced a higher average value for the balance, because portions of it would be nearer the heart of the city. I gave the testimony of Belden such consideration as I thought it worth.

Item 58, N. line, from mile post 167, 8,700 feet west, within limits Negaunee and Ishpeming, right of way for single track, considered equivalent to a width of 50 feet. This item corresponds to Riggs' item of track rights Negaunee, main line 8,700 feet. On an assumed width of 50 feet, part of this description valued at \$4,000 and part at \$3,000, producing a value of \$34,000, against

Riggs' \$43,500.

Item 59, Teal Lake branch to Negaunee, 7,300 feet; Riggs' value

adopted.

Item 60, track rights, Palmer branch to Milwaukee mine, 9,200 feet, valued at \$1.50 per lineal foot.

Item 61, S. line in Ishpeming and Negaunee, mile post 167 W. to center line, Sec. 11, Riggs valued 12.77 acres at \$1,000 per acre; I valued 12.4 acres at \$3,000 per acre, on the theory of \$3,000 per acre in developed mineral territory; we be-

lieved it such and so increased it to be consistent.

Item 62, 38.3 acres; 8.3 acres from west end of item or Ishpeming limits at \$1,000 per acre, and balance, 30 acres east toward Ishpem-

ing and Negaunee, at \$3,000 per acre; arrived at this in the same way as other mining values.

Item 63, 9.6 acres, at \$3,000; Riggs' valued 9 acres at \$3,000.

Item 65, 7 acres at \$3,000; Riggs' value, \$3,500. Arrived at value on same theory as other developed mineral lands, giving same value to all land where we believed mineral might be said to exist, except where we were higher on account of the added value in the city. Where mineral value was the only element, \$3,000 was our limit; \$1,000 was where there was a lesser possibility of iron ore.

Item 64, 5000 feet in Ishpeming, N. line of Sec. 10, to center of line Sec. 9, \$3,000 feet at \$30 and 2,000 feet at \$5; Riggs valued entire at \$30; I made distinction in price because I considered east end to be of higher value; the 3,000 feet ends between sections 9 and 10. I took into consideration all elements including minerals and gave a value to the 3,000 feet, because of possibility of land being underlaid with iron ore.

Under 2,000 feet possibility of iron ore also; the east end was of higher value on surface, being in more valuable quarter of Ish-

peming and not because of greater mineral rights.

743 Item 68, Mary Charlotte Branch; Hansel 3 acres, value \$100; Riggs 3.2. This appeared to be in active mining district. Values subsequently increased to \$2,000 per acre. Portion of Palmer Branch also appeared to be in active and potential mining district. (Value subsequently changed to \$2,000 an acre.) On consultation with my assistant I fixed values on Michigamme, Republic and Champion station grounds and on Champion mine

branch. At Humboldt, I allowed 4 acres at \$100.

I remember the 1,500 feet of water front at Houghton. South Shore road goes into Houghton on the best line and easiest entrance from east; and it must have yards and terminals on water front. If riparian rights in use, it would be worth more than I have fixed. All of the land along the 1,500 feet is in use; I excluded part of its value in appurtenant riparian rights and I have excluded riparian rights for the reason alone that they have not been developed into railroad use or any other use. It could be sold or occupied by others under lease to bring in an income, it has not been so done. You are not using the riparian property, which is a mere right attaching to the land because of its location.

You are using all of the fast land, but not that under water, which you have the right to use. I almost always, in my experience, separate the value of the land under water from the value of the fast land; it is generally separated. The upland, fast land was necessary for railroad use; frequently that land is bought separate from its riparian rights. I don't know what you could have done there; it is

the rule, rather than the exception, where the values are high.

744 In a sense, I have not allowed the value of mineral rights,
because, if I had, we might have gone to such a sum as to be
prohibitive; I don't know what the mineral values are. I think
the cost of the getting onto the surface would be enhanced, because
of the value of the mineral underneath. With the riparian rights,
you still have them, you own them. In the other case, you don't

buy them. I den't assume the responsibility of a basic figure used

by me for right of way, but do for the multiplier of 2.

The population figures in Defts.' Ex. 15, were taken from 1910 census; Baraga, 100 (p. 10) is probably a misprint for 1000. The term "present worth", as used on page 5, defts.' Ex. 15 means a reproduction cost of the segregated items new, less a percentage to represent present condition, but not commercial nor fair taxable or sale value.

As far as I was engaged in the problem, it was to ascertain a correct inventory of the parts, including lands, structures and equipment, not including intangible value, cost of developing business, or cost as a going concern, or franchise or good will value. My results do not purport to give any opinion of fair value of the property as a whole for use as a transportation machine in production of ton and passenger miles.

In my profession, there has grown up in recent years, especially since the Michigan appraisal of 1900, a quite well established

practice of getting at reproduction cost; much has been done toward accomplishing the definition of value applied to various conditions for various purposes. Some things are now reasonably settled which were then subject to further consideration, doubt and dispute, but many problems remain about which there is difference of opinion in my profession, and among economists, publicists and lawyers. Most of the differences are referable to the underlying conception of "value", the particular definition for that term as applied to the particular purpose of the valuation.

The value of the use of an instrumentality for the performance of its function, may be, and frequently is, very much more than its sale value or its taxable value. It may be either below or above

its sale value or its taxable value. It may be either below or above. The terms "present worth", "present value", and the like, are indefinitive. We must consider the matters heretofore refer-ed to in this cross examination to properly weigh the value of any reproduction figure, however accurately made. Usually, and generally speaking, the value of the use of a thing for the performance of the function for which it is created is greater than its second-hand value. That would be true of locomotives, cars and movables on railroads generally, except that there are periods of depression and of affluence which affect conditions, depending largely on the period of time through which it has been operated and accumulated friend-

ships, interchange of business and contracts of advantage.

As an instrument of commerce, a railroad well located and built in obedience to a reasonable public demand, economically constructed and properly maintained, is usually worth more

than the cost of its parts new.

It is possible to conceive of situations where the reproduction new cost might exceed its fair value; want of necessity, or want of economy in building, might show the other side of that truth. In seeking to establish a reproduction cost new, the first conception indulged is, that the property to be appraised does not exist as a railroad or part of a railroad, but has existed, and that it is to be created, replaced or reproduced; that is, that the right of way is unimproved for railway purposes, but that the community, contiguous lands and properties are in precisely the same condition as now. The change conceived is the obliteration of the railroad, except that the land is presumed to be in the same condition and devoted to the same uses as the abutting land.

Further on the same subject indicating that in the problem the land is to be treated as being of the same character and condition as

the adjacent areas are at present.

Original cost or condition of right of way is ignored in getting at

reproduction new, figure.

Generally speaking, the conception is that the particular property, of the same general design in its lands, improvements and moveable parts, is to be reproduced, except that, if an equal or better design can be constructed at smaller cost, it should be so considered.

747 That principal I applied sparingly; it should be applied with great care, to avoid speculation and conjecture. The grades, curvature, alignment, rolling stock and structures were taken as

they are, as a rule.

After organization of corporation, the first thing to be thought of is, where you will get the money to build; in reproduction problems, that ought to be thought of—how much you will need, how you will get it, and what you will have to pay for it. It is proper to take into account fair and reasonable cost of financing, in getting reproduction

figure.

That includes interest on idle money during construction, which is a proper charge. It is now well settled in my profession that whatever would have to be reasonably paid ought to be allowed in this kind of an estimate of reproduction cost. The amounts to be paid depend upon the prospects of the company, condition of money market, etc., but the prospects of the property would be principal factor. The prospects are shown more accurately under the conditions we are trying to act under than they showed at the time of the conception of the scheme.

The element of certainty of success would tend to decrease the cost of money; a certainty of failure, more or less well grounded, would prohibit the enterprise. I assumed that if the property here was to be bonded at 5%, bonds could be sold on 6% basis. I assumed that the money could be borrowed and that the railroad was going to be

built.

I didn't review the history of the past, or undertake to form an opinion as to whether it could get money on a 6% basis or at all. I assumed that if it could not get it at 6% it could

not get it.

Q. Now let us assume a railroad in any part of the western country, with the mileage and trackage that this has, or assume the prospectus of the creation of one that would cost \$15,500,000, that is about your reproduction new figure, and an annual interest charge of \$913,700, and assume further that in 25 years of its history it never earned that much, or could not, its net earnings never amounted to the interest, and that of recent years it averaged about \$500,000; on that as-

sumption, and for general application, you would not say that the money needed to produce or reproduce it, could not be obtained.

A. If a property to cost \$15,000,000 was shown to earn only \$500,000, I doubt if there would be any possibility of financing it at any rate of interest; for the further reason, that the earnings estimated are insufficient to support the capital, and the estimated earnings are generally as high as the imagination of the promotors can fix them, and the financiers generally underestimate the income rather than overestimate it.

On property like South Shore, with mileage planned, and prospect of earning less than an interest charge of \$900,000 annually, you could not obtain the money on such a prospectus at 6%. In some cases, there is a value, to other properties which it joins, or which operate it, that would make it desirable to construct and oper-

ate at a loss. That was not the consideration of my reproduction estimate, which was that it would be built as an independent property and that the ordinary interest charge which would warrant its being built as an independent property, would not exceed a 6% basis. To get the money at 6%, its prospective earnings should be twice its interest, that is \$1,800,000 per annum above

operating expenses and taxes.

Assuming the South Shore road in Michigan, well located and maintained and economically operated, and built in obedience to u reasonable public demand, and that its net earnings, after operating expenses and taxes, for a score of years, has averaged less than \$900,000 per year, in my opinion its earnings are too low, either from want of business or low rates. The description of territory (pp. 10-15, of Deft.s' Ex. 15) would indicate that there must be relatively little interstate passenger traffic on lines of South Shore in Michigan, as compared with railroads of New Jersey, Southern Michigan, and Michigan as a whole. (Subject to objection that the answer involves an examination of traffic conditions, which witness has not made.) Had I been studying the possibilities of business on the line, I should have gone into the question of what traffic was probably tributary to the line. I have only indicated the character of the villages and hamlets, and given the population in the various counties, to indicate the density of settlements as affecting the 750

If the population indicated on Deft.s' Ex. 15, (pp. 10-15) included all people naturally tributary to the line, there would be a sparse passenger traffic. The haul would be short, though that is often an advantage; the haul would be greater per inhabitant than in a densely populated section. Upon a prospectus describing that territory and this property with a 2¢ passenger rate, I would not loan \$15,000,000 at 5%, if it were only to haul passengers; I would not advocate such a loan with freight and interstate passenger business, the total of which never amounted to the interest at \$900,000 a year on the average.

Q. Would you not also think that on those conditions which I have assumed in that question, supplemented by what you observed, two cents per mile for adult passengers is too low in that territory to

justify the creation of that property or to make it possible to create it on the hypothesis that you could borrow and get fifteen and a half millions at six per cent?

Mr. Wykes: I renew all the objections previously made.

A. I understand the question, and in answer I will say that I have not studied the amount of business; in some sections people travel oftener than other sections, and I don't think I have sufficient facts either to accept-to advocate or turn down such a proposition; I don't think I have had enough facts before me to answer either

way. Assuming that this property has not averaged for 20 years, 751 over taxes and operating expenses, the interest charge of \$900,000 per year, and assuming my description of the territory to be true, 2¢ passenger rates would not enable the borrowing of money to reproduce the property, if that was all the business of the company. Assuming that was not all the business, but that the total business on the average for 20 years would not pay the interest charge, the case

being entirely suppositious; I don't think you could get the money. Any project that had to bear a heavier interest charge than 6% could not be prosecuted. If the charges on that property have not for 10 years averaged enough to pay the interest charge, which I have assumed to be necessary, as low as 6% (the case being suppositious) the charges or aggregate net earnings are such that such a piece of railroad, with contemplated or assured earnings which were

below 6% could not be financed.

To procure the money on 6% basis, the earnings in prospect ought to be twice the interest charge; if they were less than that, I don't think the money could be obtained. I don't think that, unless by a fair and reasonable prospect it appeared that a property such as this would earn net above the operating expenses and taxes \$1,800,000 per year on the average, taking good and bad together, the money could be procured to built it.

A schedule of rates which, taken on the average in good times and bad, does not give reasonable assurance of net earn-752ings of twice the interest charge or reproduction cost new at 6% are too low, in my opinion. The trend of feeling is that way; on going concerns that can borrow below 4%, I have considered that an annuity of 5.5% and taxes should be allowed before intangible

value would be considered.

If we didn't believe the earnings could exceed \$500,000 average, I feel that on such a statement it could not be financed without more business or higher rates, or both. On 5% bonds selling at 85, \$15,000,000 of money would be raised by about \$18,000,000 par value of bonds; this would require a 40 or 50 year bond. It is easier to sell a 5% bond on a 6% basis than a 6% bond at par.

After determining interest rate, we must determine length of time required to reproduce the plant. This is a matter of judgment, and. in some cases, of great difficulty. Frequently, the interest at half the rate for the full time is estimated as necessary; that is the general

practice of the past. I have analyzed it more closely, and taken it item by item and calculated the time that the money would be used,

in the belief that the practice has been far from accurate.

I did not apply any supposed net earnings during construction to interest account, but figured that when portions of the line are finished the interest charge would cease. Operation of a part during construction would be attended with greater overhead and adminis-

tration charge on a few miles than on many.

I don't think the operation of a considerable division of the road when completed would render the carrying of business on the completed part more expensive, or hinder the construction operations. The completion of the road enables the company to earn from outside business and to handle its own materials better than if it had to carry it by an inferior transportation facility. In any particular reconstruction problem, it is assumed that company will handle its own material over completed parts, but they do not carry it free of charge. To carry passengers and freight to intermediate points contemporaneously with the haul of that material could not be attended with greater cost than if the road were completed, because the demand of the public for service would not equal the capacity of the road. They could not expect to handle or secure as much business in the beginning as ultimately.

Ultimately you would get the cost from it or more, depending on volume and conditions of operation. I think it was not proper to subtract anything from interest charge on account of the earnings from a part during the 2.5 years I assumed necessary; each particular property presents its own problem. Interest should be allowed on the overhead items which occur; if incidental expenses don't

occur, that is an over-calculation of interest charge.

A variation of allowance for interest analyzed on my basis would occur between appraisers of equal capacity and character on account of the differences of time and of rate charged. It is conceivable that discounts, commissions and interest might substantially exceed 6%, but a going concern in many cases can get money at 4% at par today; e. g. Pennsylvania Railroad. I think it

would be absurd to calculate the interest here on that theory.

To get at the cost of obtaining right of way, you would have to deal with individual owners; you assume the right of way runs through their land and severs it. The meaning of severance damages is understood; we took it into account in making this appraisal. The depreciation of abutting lands not taken is always involved in the cost of acquisition; that amount is difficult of ascertainment, as in some cases the railroad appreciates and in other cases depreciates value in estimate of owners.

Straight through a 40 acre tract (Government survey), a 100 foot right of way would equal 3 acres. The amount of damage to that 40 would be affected by the manner of crossing it, its topography and the location of streams and highways; each tract presents its own problem in getting at the severance damages. It might in many cases be cheaper to buy the whole lot, this is frequently done, and is good business.

The value of the use of the land in a street is, I think, just as great as if the fee title was in the railroad company; in getting at reproduction cost I didn't give it any value, I didn't allow anything for the land or rights in it. Where revocable rights, not likely to be revoked, are used, they have a value, to include which would be speculation, though perhaps it ought to be taken into consideration.

Page 18a, Defts.' Ex. 15, Hansel's assumption was the track 755 was wholly within street, and no value for right of way there was used; if third party owned yellow strip between Lake St. and the lake, damages would have to be paid for cutting off his street front if they existed; it may be an advantage, ordinarily it would be a

damage.

If it developed that buildings not requiring railroad facilities were there, there would be considerable abutting damages. railroad running within 10 feet of the shore line would enhance the value; there is no rule. In many cities, it would appreciate the value In case one if they could have a railroad along the water's edge. owner owned a large tract along the shore line of a harbor, it would depend on the shape of the ground and depth of water as to whether he would be damaged or benefited.

If the riparian rights, when the railroad came, were of great value to the owner of all the shore on the harbor, and the railroad took all the land, the riparian rights would not of necessity be impaired; they Whether I would allow for damages might be materially enhanced. to the riparian rights, I would have to decide; there is no precedent

If there was damage, I would certainly allow it.

I considered that all cost to acquire certain tracts would be as shown Where the railroad company was not using riparian in the schedule. rights, I allowed nothing for them, meaning I did not itemize or schedule them as an asset or cost of construction; that is my uniform rule.

In the appraisal of all right of way, including Houghton 756 station, I included damages, if in my judgment there was any damage. Totake all the fast land of the 1,500 feet on Portage Lake at Houghton would probably impair the value of the riparian rights, and to that extent it ought to be allowed; had that been developed, I believe it should have had a much greater value than Riggs gave.

The value of use, by carrier, of land in vacated streets and donated lands is as great as though paid for. In prospectus to get the money I would not say property was of less value because using vacated streets; this involves definition of value, whether cost, use or sale The cost value is less, due to things not paid for, but not the useable or sales values.

There is a good deal of uncertainty in getting at the amounts of legal expenses in a reproduction problem. They cannot be inventoried; they can only be appraised. By reason of this uncertainty, I added a contingency of 10%. The same is true of organization, administration and interest, to which I have added a contingency.

The expression "contingency," as used in this schedule can be defined as covering uncertain items that may or may not arise. has been much discussion about the allowance of anything for contin-If the contingencies arising are properly allowed, the amount charged is just as much of an investment in the property as anything else. In such an estimate as this, they are absolutely essential, and it is as legitimate as the item for locomotive engines.

The contingency item, in estimating an existing property, differs from that where property is not constructed, but there are contingencies in all cases which I think should be provided for. The percentage is variable with the cost of the elements to which applied. It is now the practically well settled practice of my profession to allow contingencies, and there is no doubt about its propriety in my profession. The percent has to be determined with each particular condition.

The correct definition of the things which justify this allowance is: "uncertainty," "unknown conditions," "those which have not

been, and cannot reasonably be ascertained or foreseen."

Upon such an inspection as was made by me on South Shore property, it is difficult to ascertain, without soundings, the yardage actually hauled onto some of the places; in those cases we gave 100% more than was shown on the surface. Ascertaining by measurement, the quantity might be increased or diminished; in such cases the quantity was small. It could only be determined by doing the work; the profile is not reliable, mathematically, because the earth may sink away. I would not say that the measurement quantities are always more rather than less, my instructions have always been that the excess of quantity is always given over that which would appear in the prism of a profile, or even the prism as found on the ground. In case of a yard in existence 50 or 75 years, there is no way of determining

what the surface of that yard was before filled in.

The yardage in an old road cannot be found precisely, and one reason is you cannot tell how much has sunk into the surface. The density of the embankment increases with time; that could not be produced except by time. Engineers allow for the settling of the surface under the weight, including that settlement in the prism by requiring a certain percentage of elevation to be put in the bank over what is ultimately expected to be there. That percentage is understood to cover shrinkage and settlement.

An old roadbed is cheaper to maintain and worth more to use from every point of view than a new one. It is recognized uniformly, the world over, by railroad engineers that the roadbed appreciates in value

with the lapse of time and reasonable maintenance.

Assuming that a road bed was new at X number of yards, that after being properly maintained for a quarter of a century it still had X number of yards, but in the meantime had become solidified, stable and steadfast, vegetation had grown upon its banks, the slopes of the cuts had become fixed, the road had ceased to settle, slide or sink, it

is worth more and is a better tool of operation.

By adding a percentage to the actual quantity that is estimated you can, as far as intelligence will permit, cover that item by yardage, but not in stability. The knitting together, in steadfastness, is one thing, yardage is another. You cannot produce the former except during the same period of time and under the same conditions. Nothing was allowed for that appreciation, except in an increase of quantities. The appreciation would be shown in the commer-

759 cial value of the road. Nothing was allowed in my figure to

show the value or quality of solidity of the bank.

Railroad men recognize that the old roadbed, reasonably well maintained, is of much greater value than a new one of the same kind. That can be gotten at by the difference in cost of upkeep. Safety, dust, comfort and use would all be elements; I do not know how to estimate that. A new roadbed is more apt to wash out than an old ene, accidents are apt to happen from cloud bursts or heavy rains and the cost of maintenance is less in the old road. Speaking generally, there is a very large appreciation of value in the roadbed, due to proper maintenance and lapse of time, which cannot be reflected in a reproduction new estimate. This road bed is a more economical and safer operating tool than a new one. The extent of that I did not estimate.

Mr. Wykes: It doesn't involve any expenditure, you don't claim that it involves any expenditure other than would be reflected in the cost of reproduction, as Mr. Hansel has fixed it.

Mr. Butler: I am one of those fellows that thinks that the thing that I have got is of the same value, whether it involved expenditure

or not.

Mr. Wykes: I am not questioning you on that.

Mr. Eldredge: I shall never give you a present because you will never appreciate it unless you paid for it.

In work done by contract, the contractor estimates a profit and assumes the liability for contingencies. Unit prices here are based on contract work; I didn't base them on actual cost. Loss by storms and weather are included in the unit prices. The percentage added for contingency is intended to include all contingencies of every kind whatsoever. My contingencies do not allow for damages by a heavy rain before road completed by contractor and turned over.

I cannot say how much I allowed for contingencies for grading in unit prices; unit price was intended to cover the cost of that work, including the contractor's profit. The experience in fixing unit prices includes all conditions of bad weather, etc. I allowed 10%

in the contingency item on grading.

In addition to the 10% of quantities allowed, 10% again, on the total, is sufficient to cover the contingency item of grading, after the contractor has turned it over to the company. If it was assumed that the company was to do the work, the contingency item would not be larger. If construction is to be done by company, the unit prices would be smaller than the ones I took—at least 10%.

We have added much more than 10% in quantities; in many places, where holes and soft ground are indicated on the profiles, 100% was added to quantities, and the additional 10% besides; the blanket 10% was on account of possible allowances that should have been made in quantities or prices. It is as proper to allow contingencies for unit prices as for quantity.

Delays in receiving material may delay the work of construction, or make it necessary to put in a temporary bridge; that ought to be covered in unit prices. In a way, you can foresee these things by experience. If we do not encounter those difficulties, the profit is greater. I think delays in traffic ought to be included in unit prices, not in contingencies, as should loss of men's time by bad weather. If the company did its own work, there would be no unit price, though I would estimate the graduation at contractor's price. The estimate would be the same in all respects as to quantities. The possibilities of strikes, and all contingencies of every kind into which labor entered, including track laying, I would include

in unit price, as I would, also, demurrage on material.

The delay, or loss, adding to the cost of construction, would fall on the contractor, if there is one; nothing would be allowed to contractor for that, unless otherwise specified in the contract. The item of cost of material yards would fall probably under contingencies. Assuming no contract, it would fall in the unit price, assuming a contract, it would fall there too; so it would be in the unit price either way. That would apply to all the elements of track laying; also, the engineer would have an item for an estimate of the cost of the material yard; I didn't. I made no distribution of the cost of the yard to any items. No allowance in contingencies was made, though, if found to be an increase, it is properly a contingency. Personal injuries, accidents and insurance would be contingencies, except it be a contract.

The contractor generally bears all the losses. There is chance of personal injury in track laying operations; there should be no contingency, as I think the price given is ample. In the case of the contractor being the railroad itself the difference between unit prices and the contractor's prices provides for the con-

tingency. The cost of reproduction ought to be the same, whether there is a contractor or not. If the railroad company did the work, the engineer's duty would be to estimate the cost in advance; the classification of accounts would be of the same names and in the same form as here. You would have an item of contingency on such an

estimate, for the company to do its own work by.

In case of construction by the railroad, the contingency item would be carried in the difference between the unit prices and the total estimated cost. It would be included in the difference between what I would have to pay a contractor to do the work and the total estimate of the work. I would include the contractor's profit in my estimate, though I had no contract, and all those contingencies would fall against the contractor's profit. The possibility of personal injuries would affect the total of the contingencies. My estimate for contingencies, being a little more than 3% of the total estimate, as a great deal of the total is for land, does not include anything for personal injuries, strikes, mistake of plans or change of method by engineers, for demurrage, for delay by transportation, for difficulty in getting or keeping labor, or anything on account of the uncertainty or appraisal of land; that is covered by unit prices, and, in case of land, the contingency is covered by the added 100%.

I intended to make the real estate price so high that no contingency would be necessary. The quantity is not uncertain in the land. Contingencies are allowed to cover uncertainties in price as well as in quantity. Contingencies for strikes, de-

murrage, loss on account of controversies between engineer and contractor, material yards, difficulty in securing labor and uncertainty of unit prices is included in contractor's price, which I always assume in figuring. I added 10% for contingencies to each of the items, 3 Grading, 16 Sidetracks, 20 Shop Machinery and Tools, 29 Engineering, 38 Legal Expenses, 39 Organization and General, 40 Interest and Taxes, 41 Fixtures and Furniture, 42 Stores and Supplies.

No one would expect the same percentage to apply to each of these items; it could not be precise. The item of contingency cannot be the result of analysis; it is a matter of judgment, based on experience. You would not include a grading price high enough to cover the 10% here allowed, as that contingency covers quantity as well as price. The same result would be obtained by applying it direct, so much in quantity and so much in price. 1 think 10% added in Cooley appraisal for contingencies to the whole; at that time engineers did not attempt to analyze.

They had not added 100% and 25% to quantities that I have added, so they are hardly comparable. If I analyze closely, the contingencies diminish; I don't know as I know of the reproduction of a railroad by any state or railroad engineer where the percentage of contingency to the total was as low as this. For a road to be built, I should estimate higher; sometimes I go as high as 15%, I think the practice is from 10% up. Of course, they are not in a position

to analyze as closely as I was in this case.

It is frequently necessary, on account of indeterminate factors, to allow higher percentages. I don't know, as less than the 4% on total allowed by me is much lower than customary or usual for new work, or for estimate of C. O. R. I have studied percentages allowed for contingencies; as high as 10% has been allowed by many engineers for specific purposes; e. g. cost of reproduction of a railroad. I cannot tell what percentage of the total has been allowed in state estimates and by railroad engineers. is no common practice on the subject of reproduction; we are in embryo state on that.

I don't know of any of the railroads that you speak of that have actually surveyed the line, and therefore the contingencies must be higher, and under certain conditions of unit prices contingencies

should be higher or lower.

In New Jersey, I included contingencies—called it overhead charges, interest, and so on; that was everything; we included engineering, interest, lawyers and organization at 7%; it was too low to get fair reproduction value. It would be too low here, because I have allowed 16.4% on those same items.

There is a customary practice in engineers' offices as to contingencies for work to be done; the minimum on railroad work is 10% of

the total, covering everything.

Q. Now, the justification then for a lower percentage here lies in the fact that the work exists, a greater familiarity and ability to analyze the costs, than would be in case it did not exist?

765

A. That is the controlling factor, yes.

In reproduction of this railroad I have assumed completion of the whole in 2.5 years from time construction was begun on any particular division. Assuming any division could be concluded within 2.5 years, I assumed as divisions from St. Ignace to Marquette, 155 miles, another from Marquette to State Line and another from Nestoria to Houghton, each taking 2.5 years, whether done contemporaneously or not. I would have material yards at several points, as stated in Defts.' Ex. 15. Assuming the existence of other railroads, I don't think it would take more than 2.5 years for entire road to be built at the same time. Some parts of it could be constructed in better time except for soft or swamp ground. The cost of the legal end, in the preliminary work, before acquisition of the land, would take over 2.5 years, perhaps I ought to have added another six months on that item.

At the end of 2.5 years, you would not have as good a roadbed as now, because it has to have age to season it; that cannot be included in reproduction. If the operation is successful, as to that item, reproduction estimate is always necessarily less than actual value as an operating tool. As an instrument of commerce, the roadbed solidifies by time, and operation over it is better. Much of the roadbed in flat, soft country is made of gravel hauled from pit over a long period of years. This is done at an increased cost over reproduction

new estimate. It is impossible to say when construction ends

and operation begins.

766

A considerable amount of yardage must be moved after contractor finishes and during the first few years of operation, to take care of settlement, shrinkage, maintaining shoulders, etc. It is difficult to consider that item under a percentage, as height of bank has much to do with it. As to unit prices, the fact that quantities were put in piecemeal is not considered in reproduction estimate; as to quantities, an effort has been made to cover that point. I aim to get the quantities that were there, and assumed that they were put there as part of the original grading. As a practical matter, until you have

sod on the bank, you must keep renewing it.

In the existing road, the grades have been corrected, cuts filled in, high bluffs cut down and curvature and alignment changed, frequently resulting in abandoned property, which reproduction estimate does not reflect. Reproduction estimate does not reflect added cost due to piecemeal construction. Generally speaking, the yardage put on after operation of the line commenced would cost more to get it there than if it had been put on all at once. This is due to slow orders and all that. On the other hand, we must remember that, with a track there to haul our material, in many instances, it would be done cheaper. Generally it would be dearer, but, if you go into as much as half or a quarter, I don't think it would hold, when a small amount has been added, it is a great deal higher; the smaller the quantity, the greater the increase of unit cost; that increased unit cost, might increase average substantially.

767 Have made a study of the progress of cost of grading per yard during the past 50 years; it doesn't result in giving me any information. I have consulted contractors, in some cases they are higher, but increased efficiency in tools, and the knowledge of how to do, sometimes counteracts that. Leaving out of consideration land costs, and taking into account piecemeal construction, I think,

in come cases, if we were able to analyze those things, we would find that the first cost of a railroad was higher than the cost now to reproduce; I think frequently, enough to take up the increase in value of right of way. Concrete and constructural steel are the only items which have gone down.

Rail 30 or 40 years ago cost \$60 to \$100 per ton. It would be difficult in the absence of records to ascertain original cost of South

Shore.

Q. Assuming a development and growth of the road like the South Shore in that territory during a period of say 30 years, you would expect original cost of the parts of that road, leaving out the land now for the time, to be as high, would you not, as your estimate of reproduction new?

A. I don't like to go on the record, because I haven't had an opportunity to make that search, but I would be under the impression

that I might expect to find that to be true.

Cost of reproduction of South Shore would be increased, I think, if there were no other railroads in the territory, in cost of supplies, subsistence, materials, labor and boarding men.

Q. The problem of depreciation, I think we agreed during the cross-examination, was an important one, and quite elusive, like the definition of values?

A. Yes.

I did not intend to represent South Shore as in only 81% of operating efficiency, or that it is not in proper efficiency. The 81% is the first column depreciated into the second column; you could not get the second column without first spending the money in the first. I did not intend to indicate that the value of the use of the property in its existing condition was less than the value of its use new. Certain parts of it as an operating tool are more valuable than if brand

new

This is true of all parts of the road, so far as earnings and operation are concerned. My depreciation is based on inspection. The percentages of condition arrived at by application of straight line method of depreciation does not represent value any more than present value column or percentage column in my appraisal; they are often unjust. Railroads, generally, reasonably well located, with reasonable traffic and rates, properly operated and maintained, are always worth more than reproduction new cost; we pre-suppose a net revenue if they have reasonable traffic and reasonable rates. Assuming a reasonable volume of business and reasonable rates, the South Shore road as an instrument of commerce is worth more than

my estimate of its reproduction new cost at \$15,500,000, leaving out the terminals. The commercial or sales value may be

destroyed by reduction of rates.

If the road was earning a sum over and above its fixed charges, it would be worth more than it could be produced for, meaning the commercial value or the estimate of its value in the eyes of the public, as shown by the earnings. The par or market value of the stocks and bonds, or the sale value, has nothing to do with the value of the use of the property.

Including International bridge, Soo Union Depot and Mackinaw Transportation Co. property, my total reproduction new value is \$15,949,099, and present value \$12,334,745. This is the face of our

totals, not including corrections.

It is a principle of East valuation not to depreiate labor items; Mr. Riggs, and everybedy I know of, carries track laying at 100% because it is a labor item. It is a question, very debatable. Track laying and surfaceing includes the temporary surfacing before ballast is applied. On ballast I did not depreciate the labor of applying, but did depreciate the material and hauling.

The hauling is a labor item; everything can be reduced to labor. We allowed 2¢ for buildest material, leaving 53¢ labor and hauling, or 4% material to 25% labor. Everything comes down to labor.

Q. Isn't it - w deeline to depreciate the 96% of labor in ballast as the 100% of labor in track laying and surfacing, or the 5% or 6% in rails, or whatever per cent it is in rails?

770 A. Well, it is true that the value of all material is practically dependent on the cost of the labor, and the assumption in this case was, as with all other material, that the price of the material alongside was 35 cents, the same as we would purchase steel at \$28 a ton, if we attempted to keep the labor item up. Of course, in the rail we would have to go to the steel mill, and go everywhere where the item of labor appeared, and I presume that there is a criticism, and that perhaps the whole thing ought to be depreciated including the labor

Q. Here is an item of track laying, which is labor, all labor, a hundred per cent; now right there, analogous kind of work is ballast-

ing; that is most all labor?

A. Yes, everything is all labor. Q. Well, the ballasting as you analyze it—take the item as it is built up, applying ballast, it is 96% we will say for the purposes of the point, labor; now track laying is all labor, you carry it at 100 per cent?

A. Yes.
Q. And the question has come to my mind: I cannot answer myself-why shouldn't ballasting be treated in the same way, at

least insofar as the 96% of labor?

A. Well, I can't say; if we carried out that theory, of course, it would apply to every item in the railroad, that we ordinarily buy. Here is how this comes about: We ordinarily buy the ballast at so much a yard delivered alongside, and the railroad installs the

771 ballast with its own force, the same as it does the rail or any other thing they buy. Now, if we analyze everything down to its constituent parts, probably 95% of everything would be labor. I was saying how this comes about. I presume, strictly speaking, that we should depreciate all the labor, but I don't know, that is a point just between.
Q. Don't you see what led to this? It was the item of rails, where

you did not depeciate the hauling item or freight item of rails?

A. No.

Q. But you do depreciate the haulage or freight item, so-called, of the ballast, and it struck me that there was a sort of contradiction or anomaly there?

A. I don't think there is, after all. We generally buy the rails delivered F. O. B. at the point of delivery; we generally buy ballast the same way, and all other materials that go into construction, and the habit has grown up, I presume, the habit of thought that because we do that and because there is no expenditure on the part of the railroad for the labor in the steel plant, or in the hauling of the steel or any of those items, we consider the cost of that to be 35 cents in the case of ballast, and that the labor is performed by the railroad, and that it is constant. I don't know that that can be defended or I am sure I don't know whether that could be defended. It perhaps ought to be depreciated, and that is how we have depreciated it, whether it is correct or not.

Q. You think that track laying ought not to be; the prac-772

tice is settled on that, isn't it?

A. I have always kept it constant. At the time of my appraisal in New Jersey, we debated that for hours and hours, and we couldn't

come to any conclusion that was entirely satisfactory.

Ballast needs renewal from time to time, due, in large measure, to its sinking into roadbed. Upon the ballast sinking into the roadbed, it makes it better and more solid; on soft ground, I would prefer earth, or even hay, as a mattress. In the bank that has been made, filled, it is improved as a usable thing by addition of ballast. Railroad men like plenty of clean ballast, they don't figure on any value. They may consider it of value to the roadbed, but not in the value of the ballast, as it has ceased to be ballast. As a rule, it makes the railroad better. The roadbed is better after the second application of ballast, to take the place of the first, which has sunk into the roadbed, than it was before.

My estimate does not take into account betterments to roadbed by gravel additions put on as ballast. The ballast, after it settles down and ceases to perform the function of ballast, may or may not strengthen and render more stable the roadbed. A hard or solid roadbed is not desirable, but a springy but solid roadbed is. I don't suppose experience justifies the inference that the adding of ballast upon soil on South Shore makes bed too solid. It is the solidification

of the embankment which makes it worth more. gravel ballast sinking into the soft and unpacked places in 773 the soil on roadbed like South Shore makes the road worth

The common method of construction is to elevate the outer rail at curves according to speed desired for trains; a well recognized formula for this exists. They also increase the guage owing to the degree of curve.

This is to avoid crowding the outer wheel over the rail, i. e. to The outer rail is longer than the inner; the help slew the trucks. wheels do not turn on the axles of the truck, and both wheels have to make the same number of revolutions, so the wheels traveling on the inner rail have to slip some on the rail.

If the elevation of outer rail is markedly excessive for the speed at which trains move, flange will not wear inner rail; it never does that. There would be greater stress and wear on top or ball of the inner rail-not on inside. In direct testimony, I was only asked about inner side.

HANSEL.

Redirect examination.

By Mr. Wykes:

I have prepared a statement indicating corrections in Defts.' Ex. 15, Hansel. (The following indicates the corrections:)

774 Memorandum of Additions to the Hansel Appraisal of the D., S. S. & A. Ry. Ex. 15.

Schedule I—Real Estate.	Value new.	Present value.
Sault Ste. Marie, Items 2 and 3, page 17:		
50 foot right of way to Kelley Mayer Co., American Brick Co., Bradley Watkins Co. 2.8 Acres at \$1500\$4200 1/2 Interest	\$2,100	\$2,100
Marquette, Item 49, page 20:		
Consolidated Fuel & Lumber Co. grounds, 2 Acres at \$1500	7,500	7,500
Marquette, Item 54, page 20:		
1160 ft, of right of way 100 ft, wide 2.7 Acres at \$250	675	675
Iron Mine Branches:		
Item 67, page 21, Winthrop Branch; trackage rights 1.94 miles, considered equivalent to 50 ft right of way. 11.8 acres at \$2000\$23,600 Previous total for item 67 6,900		
Tieriota total Ioi item over the	16,700	16,700
Item 68, page 21, Mary Charlotte Branch 3 acres x (\$2000-\$100)	5,700	5,700
Item 69, page 21, Palmer branch 31.3 Acres x (\$2000—\$100)	59,470 a	59,470
	\$92,145	\$92,145
Overhead expenses, 15%	13,822	13,822
Total amount to be added to Hansel Valuation, Schedule I	\$105,967	\$105,967

775	Schedule V.	Value	Present
	Bridges, Trestles and Culverts:		value.
timb	dd \$8.00 per M F. B. M. to the unit prices of er in Bridges, Trestles and Culverts, to r cost of transportation by team, etc.		
F.	B. M. and amounts tohead expenses, 15%	\$30,800 4,620	\$18,788 4,620
	Total amount to be added to Hansel		

The 15% added for overhead charges was not depreciated. It takes into account the contingencies, those are not depreciated. On a bridge, when 80% condition is reached, the time has come nearer when it must be replaced; when it is replaced, it involves an engineering charge, a new contingency with the overhead charges that apply to that kind of an item. In the railroad as a whole, as the structures are replaced, the overhead charges will again occur throughout the railroad somewhere. The points at which those will

..... \$35,420

\$23,408

occur is measured by the percentage of condition; the same applies in less degree to the renewal of parts; the percentage may be higher or lower, owing to the character of the re-

pair, but those items come under the charge of upkeep.

Valuation, Schedule V.....

As the time approaches when a structure must be renewed, the time also approaches when not only the material, but the labor as well, must be put back. In a bridge structure, that appears not only in the material, but in the labor.

Q. Tell me what distinction there is between that and the item of

labor that occurs in track laying and surfacing?

A. Well, in track laying and surfacing, the item that is expended by the railroad is in the act of placing the materials on the roadbed and surfacing it, and that is constant, no matter what the cost of the material is, and it has been the practice, perhaps without any sound basis, of not depreciating the cost of the track laying and surfacing, the idea being that the ballast is delivered at the price. The majority of the cost of the ballast may be in labor, but it is generally furnished the same as bridge timber or steel, or cars or any other item to the railroad generally speaking, and therefore the habit has grown up—that is, I have done it, at least—of considering the labor of putting that in place as a constant element, because it is going on day by day, all the time, and it differs somewhat from any other expenditures of labor on the road, because of the fact that it is an item that can be constantly kept at a percentage of efficiency, and it is about the only item that can.

Q. Then the reason you do not depreciate labor in track laying and surfacing is, that it is kept at a hundred per cent of efficiency, not that it is kept at a hundred per cent of condition?
A. That is it exactly. I stated in my testimony that, in depreciat-

ing the condition of the roadbed, I did not intend to depreciate the efficiency of the roadbed. That is about the only factor in the physical elements of a railroad that can be kept constant; it is turning over every day, you might say, except in winter time, when they don't disturb the track, but even then some things are done to it to sustain it, whereas a bridge or any other structure, you cannot overcome the decrepitude, the invisible or intangible decrepitude, there comes a time when the whole structure has got to be changed.

Q. Suppose the condition were permitted to run down to 50 per cent on track laying and surfacing, would not then, to bring it back to a hundred per cent condition, it be necessary to add both material and labor on equally proportionate amounts, to bring it back to the

hundred per cent?

A. Yes, I should say that would be true.

With the material put in to renew the track laying and surfacing goes the cost of labor of putting it in. My theory of including the cost of labor constant is for the reason that it is being constantly operated

upon; it is different from any other item of the road. 778 ope to a variety of opinions, whether the cost of labor should be astant. In my opinion it ought to be included as a constant factor. On ore dock at Marquette, I depreciated 40% covering entire structure, including labor, material, engineering, contingency and everything of that character. This was true also of buildings, I don't recall any exception to the rule, except in track laying and surfacing. Labor forms a large part of the cost of all materials; it would be large in rail. There is a very small percentage of the cost of labor expressed in the iron ore. There cannot be any betterment on account of the track laying and surfacing; it is a constant factor, which must be the same item over and over again, so I feel that it always exists there. There would be a betterment where you put in a heavier rail in the excess cost.

On the inspection of the South Shore made by myself and assistants, I spent sufficient time to do the matter justice to all concerned. In my judgment, taking into account the manner of preparation for my appraisal, the inspection and time spent on the work personally by me was sufficient to form the basis for the appraisal I made. My personal time on the work covered a period of three months—something every day. I feel satisfied that I gave the work all the time it required, and it was at all times under my personal direction and supervision. Have gone over the data at hand and comprised in the

appraisal sufficiently to satisfy myself that it is correct.

779 For land value I included the excess cost to acquire for railroad purposes, and the values I have placed take into consideration elements which make my valuation higher than the normal or ordinary land values in the community. For rural right of way we added 100%, and in other cases considered the severance damage in addition to the increased cost of acquisition.

Generally, where I rejected parts of parcels from railroad use, I gave higher price to the area included on account of the severance. The value of the whole, including the excluded area, would average

slightly below what we averaged for the whole.

I never attempted to value the land of South Shore for railroad purposes, meaning as an income producing utility; I made no investigation of, and I don't know anything about, the South Shore earnings or its traffic, except by general observation. I have no knowledge of the operations of the road. I have not sufficient knowledge to say whether it produced or does not produce sufficient earnings, or whether a particular classification of rates is too high or too low, or what it should expect to get out of a particular kind of traffic.

Q. And if you have answered any such question, is it with reservation that you had not made any detailed investigation of those

things?

A. I certainly haven't made any detailed investigation, and I do not feel entitled to answer any question along that line. I did answer some suppositious questions, hypothetical questions, suppositious cases; I gave my opinion, that is all.

Q. Leaving out of consideration entirely the Minnesota rate cases and the other rate cases that have been decided since you testified, and having in mind the criticisms of your valuation that have been presented to you, are you still satisfied with the appraisal which you have made with the exception of the places in which you have modified it?

A. Yes, sir.

Q. And those modifications appear in your testimony today?

A. Yes, sir. I have no corrections that I feel should be made. I have never made any investigation to determine rate of return expected on investments in Upper Peninsula of Michigan. I have knowledge of very many bond issues which bear less rates of return than 6%, very many below 5%, a considerable number below 4.5%, and some as low as 4%.

The general concensus of opinion is that the density of traffic decreases the unit of cost; this applies in both the passenger and

freight traffic.

Q. To answer whether the South Shore is or could be profitably operated, would it be necessary for you to know the character and extent and rates and costs of the ore traffic?

A. Yes, sir, all the traffic and the operating conditions and contracts for interchange of business with all the lines that there

781 is interchange or possibility of interchange with.

Q. Did you know anything about the ore traffic except very generally when you gave your previous testimony?

A. No, sir.

A. Would it also be necessary to know the contract and operating conditions as between this railroad and the Canadian Pacific, which is a parent company?

A. Yes, sir. I think, as I have stated, it is necessary to know the contracts with all companies, that would include a parent company,

if any such existed.

Q. A community that afforded a heavy ore traffic might indicate greater returns from railroad operation than would be indicated by population, or other industries generally, might it not?

A. Yes, I think it would be entirely independent of any such

conditions. It might be, and probably would be, independent of population and dependent upon the volume of ore and the price per

ton mile for carriage and the cost of the service to carry it.

Q. Before you could determine whether the money could be obtained to build the South Shore, or to rebuild it, if it were taken out of the territory in which it is located at present, you would be obliged to know, would you not, the earnings, the sources of the earnings, the possibility of connections with other companies, the question of whether it was making betterments out of operating ex-

penses, and a great many other considerations that have not been mentioned in this case in testimony at which you

have been present?

782

A. I would say yes to all of that.

Q. Mr. Eldredge suggests this form of question: Do you think you have sufficient knowledge upon which to predicate an opinion as to whether the money could be obtained to rebuild the South Shore?

A. No. I have not

Expense of piecemeal construction due to widening shoulders, putting in of ditches, perfection of alignment, etc. is charged to operating expenses, as a rule, and is considered upkeep of the road-bed. In adaptation and solidification due to age and renewal of ballast due to operation, there is no charge to capital for any added value growing out of those things. There is no betterment account

on ballast in I. C. C. classification.

I have made no investigation of the original cost of an existing railroad; I have not had any experience except where I constructed; I have never made any investigation of a railroad or part of a railroad 15 or more years old, with a view to getting at original cost, and have never made comparisons of costs dated back 15 years or more with present day values. There is nothing in this case which permits me to make an approximation of a comparison of the original cost of South Shore with my value or Riggs' value.

783 Item of injury to employes in contingencies; If I were a contractor, I would include it in unit prices. Road would not be worth any more because accident occurred, though it

would cost that much more.

There are many other elements of items of contingency that are a burden, instead of a value; that would apply to strikes, washouts, failure of material to arrive, and a variety of other things entering into contingencies.

All of these unfor-seen expenses are included and allowed in my

unit prices, except where I have allowed extra.

784 HANSEL.

Recross-examination.

By Mr. Eldredge:

Item 68, Mary Charlotte Branch, originally valued at \$100 per acre, now valued \$2,000 per acre; that is entirely on account of the

minerals supposed to be in the land. I made no investigation to know whether it had any other or different value; there is not any other value apparent. Regardless of what Mr. Belden stated, there is not any evidence of any demand for building purposes on strip covered by this 3 acres. I did not pay any attention to Mr. Belden; the land was unoccupied and there was no evidence of activity.

Embankments increase in value by lapse of time. I allowed no such value on South Shore in reproduction cost, except to give 10% on account of the shrinkage to try and produce the same condition which it is impossible to produce actually, meaning 10% extra yardage allowance. It is the practice of many railroads to sod their embankments and frequently the slope of the cuts. Nature does the same on slopes and banks; they add value to the railroad, and could I included no such elements in my valuation. be appraised. answer to Mr. Wykes' question, I mean that, as a general proposition under ordinary conditions, the land along the railroad increases in value after the construction.

Route of South Shore into Marquette and Houghton from east especially adapted for railroad use. I added no value on account of that. South Shore road as it comes into Marquette,

785 after crossing Carp River, presents a cheap method of constructing a railroad almost the cheapest imaginable. Referring to construction, it is very economical and leads to a natural place for a The cost of constructing that railroad and yard is less than it would be approaching Marquette from east over any other route.

Q. Would it not be a way to estimate the value of that land for railroad purposes, if you took the difference between the cost of the

construction through it and the cheapest cost elsewhere?

A. Yes, that would be a minimum value for it; it might be worth a great deal more. I didn't undertake that problem, you understand. Q. Estimated in that way, it would present a minimum value?

A. I think so.

Q. Estimated in that way, the valuation which you have put upon the company's property in Lake Street, aside from the water front in connection with the ore docks, speaking of it simply as railroad construction, is much less than its value for railroad purposes?

A. Speaking of it that way, yes sir.

Q. And that is true of the entrance into Houghton, all the way

practically from Chassell, to Houghton, is it not?

A. Yes, not in such a degree, I should think, though; not to such a degree in dollars and cents, I should think In other words. the difference per mile would be greater at Marquette. I 786 should think; it would be higher cost at Marquette per mile.

Q. Can you bear the location in mind?

A. I think I do.

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On July 23, 1913.

CRESCENT A. PARKER, a witness called by defendants.

Direct examination.

By Mr. Wykes:

I have been connected with the Michigan Tax Commission and State Board of Assessors since March 1, 1901, first in a clerical capacity, and later as accountant, performing work of accountant eight or ten years, and carrying the title since 1909. I have access to records and files of the Tax Commission and State Board of Assessors.

(It is agreed that the Cooley 1900 appraisal was a valuation of the physical property of Michigan railroads, with the intent to establish the cost of reproduction new and the present value as depreciated.) The summary of that valuation indicates the value of the separate items of physical property and the totals of physical property of plaintiff, which are: Cost of reproduction, \$11,433,202; present value, \$8,875.624.

(It is understood between counsel that the whole of such appraisal shall be considered in evidence; the record marked Defts.' Ex. 23, 1900 appraisal. Mr. Eldredge details objection to introduction of 1900 appraisal, and Mr. Wykes states the purpose for which it is introduced, being to establish value in 1900 bearing on value today.)

(Witness produces summary of 1902 State appraisal; same marked

Defts.' Ex. 24, and offered in evidence.)

(Counsel agree, with reference to the valuation of 1902, that its general purpose was this: Plaintiff had filed a bill in the United States Court to restrain the collection of taxes upon its property, claiming that its property was assessed in the year 1902 at full cash value, while

property throughout the state locally assessed was assessed at less than its true cash value. The State defended, on the ground that if the property throughout the state were not assessed at true cash value, neither was the property of plaint- so assessed. The items of the inventory of the property of plaintiff valued on the part of the State in 1902 were in general the same as in the 1900 State appraisal.)

In the summary of 1902 appraisal of plaintiff's property, the several detailed items are given; the totals, excluding stores and supplies, are, cost of reproduction, \$11,820,036, and present physical

value, \$9,087,095.

Substantially the same people made the 1902 appraisal as that of 1900, Professors Cooley, Adams and Riggs being employed. The State had passed an act assessing railroads on ad valorem basis, and the 1902 appraisal was done as a part of the Attorney General's work in defending litigation involving taxes of 1902. The railroads con-

tended that a general under-valuation of the general properties of the state existed, and that the general properties were assessed at a fraction over 81%, and the appraisal was made to show that the railroad property was not assessed at its cash value in 1902, but, rather, was undervalued.

PARKER.

Cross-examination.

By Mr. Eldredge:

The summaries of the 1902 appraisal are the only details of any kind connected with that appraisal which are in our office. These summaries were turned over — the Tax Commission after the litigation, for use in revising the 1900 figures. The railroads were first taxed ad valorem on property in 1902, and the South Shore final assessment was \$12,500,000; the assessment of 1903 was \$11,000,000.

789 PARKER.

Direct examination resumed:

In 1905, there was another valuation of railroads in which Professor Cooley participated, and of which he had charge. This was an attempt to cause the State Board of Assessors to increase the railroad valuation. The Attorney General claimed the assessment to be too low, and retained Professor Cooley and his assocates. (Witness produced summary of the appraisal, which was marked Defts.' Ex. 25, and introduced in evidence.) The summary shows results for plaintiff for 1905 as follows: Cost of reproduction, \$12,818,512; present value, \$9,960,405. The appraisal of 1905 was completed Feb. 14, 1906.

PARKER.

Cross-examination resume .:

The detail of this summary of the 1965 appraisal is in the Attorney General's office.

PARKER.

Direct examination resumed:

(It is agreed between counsel that reports of plaintiff to the Michigan State Board of Assessors and the Michigan and Wisconsin Railroad Commissions, 1900 to 1912, and all reports filed with such board or commissions during the pendency of this litigation, are to be treated as in evidence and may be referred to and included in the record, and used by either party.)

The details of value and description of property of plaintiff, as claimed in its sworn reports to the State Board of Assessors from 1903 to 1912, are as follows:

The personal property, under the caption, "Personal Property. Detailed statement o fall Personal Property, including moneys and credits owned by the Company in Michigan, on the 30th day of June, 1912. (Typewritten sheets may be attached if necessary.) Description. Personal property of the Duluth, South Shore & Atlantic Railway Co. situated in the State of Michigan as follows: Cash, Stores & Supplies, Shop Machinery & Tools, Ferries, and a proportion of the total value of Locomotives, Passenger, Freight and Miscellaneous Equip-

ment," is reported as

2,027,000

A total of

\$11,144,946

The oath in plaintiff's 1912 report to the State Board of Assessors was as follows:

"I, the undersigned, A. B. Eldredge, President of the Duluth, South Shore & Atlantic Railway Company, on oath do say 791 that the foregoing return has been prepared, under my direction, from the original books, papers, and records of said Company; that I have carefully examined the same, and declare the same to be a complete and correct statement of the business and affairs of said Company in respect to each and every matter and thing therein set forth, to the best of my knowledge, information and belief; and I further say that no deductions were made before stating the gross earnings or receipts herein set forth, except those shown in the foregoing accounts; and that the accounts and figures contained in the foregoing return embrace all of the financial operations of said Company during the period for which said return is made.

"I further state that the valuation of property, except as otherwise appearing, are my estimates of the value based upon earning capacity of the property & that I have no other means of personally making a valuation. I further state that I do not know the value of the lands listed as not used in operation and I believe that some of the lands so listed are in fact used for railway purposes, that this is a

matter not easy to determine and is now involved as a legal question in a suit between the Railway Co. & the State, A. B. ELDREDGE, President.

(Signed)

Subscribed and sworn to before me at Marquette, Mich., this 14th day of September, 1912. W. J. ELLISON, (Signed) Notary Public."

The records of the State Board of Assessors, 1902 to 1912, show the following details with regard to values reported and claimed by plaintiff, and assessments made of the property:

Year.	Total claimed in report.	Tentative assessment.	Final assessment.	by	d on review plaintiff's esentative.
	\$4,462,261	\$11,250,000	\$12,500,000		608,850
1902	# 000 10F	11,300,000	11,000,000		,000,000
1903		10,000,000	9,500,000	7	,950,000
1904		9,650,000	9,500,000	8	,434,133
1905		9,650,000	9,625,000	9	,000,000
1906	E 000 00E	9,675,000	9,675,000	No	Appearance
1907		9.675,000	9,675,000	46	66
1908		9,600,000	9,600,000	46	66
1909	# # an an	9,600,000	9,600,000	66	44
1910	44 404 000	9,600,000	9,600,000	66	44
1911	44 444 040	9,600,000	9,000,000	66	66

792 PARKER.

Cross-examination resumed:

Plaintiff was represented on review, 1902 to 1906 inclusive; its representative, on each appearance, claimed values higher than stated in the report; in no instance did the Board adopt as low a value as

claimed by plaintiff's representative.

I have been present at a number of the sessions of the State Board of Assessors when they valued railroad property; they did not make a valuation of each separate item, except through following the State appraisals. There are no details kept of the railroad assessments. The Board comes to their judgment and sets down the gross figures; I don't think the valuation of any road was ever based on an inventory and valuation of the separate items. It is not the individual judgment of any one man.

The starting point was largely the Cooley appraisal, and they took into consideration earnings and prospective earnings. They started out with the Cooley appraisal, which has always been before them as a guide. If the earnings indicate a greater valuation, they use the earning value. I think there never was but one road assessed

more than the Cooley and Adams appraisals.

PARKER.

Direct examination resumed:

The statute requires the State Board of Assessors to assess railroad property at its true cash value. The Board has before it the idea that the general property is under-assessed, and that probably affects its judgment, somewhat, in these matters, but I would not want to state.

793 The following is a part of the certificate attached to the

assessment roll:

"I do further certify that we have set down in the above assessment roll, all the property of railroad companies, union station and depot companies, telegraph companies, telephone companies, sleeping car companies, express companies, car loaning companies, stock car companies, refrigerator car companies, fast freight companies, and all other companies, subject to taxation in this State by a State Board of Assessors, according to our best information, and that we have assessed the same at what we believe to be the true cash value thereof."

The Gailbraith bill was Act 282 of 1905; under that bill, the Board attempted to establish the average rate, by bringing the other property to its true cash value. After the passage of the Galbraith law, the Board attempted, following provisions of that law, to determine an average rate, by adding to the value of the state a certain amount which they conceived was the amount necessary to bring the assessed value of the state to 100%, using that as a divisor for the purpose of determining an equalized rate, dividing that into the amount of the tax of the state for that year. The rate applied to railroad properties is the average rate on general properties of the state assessed locally.

That average rate in 1905 was \$17.40. The assessed value of the state for that year was \$1,574,422,700, and the Board, in the attempt to equalize, brought that amount up to \$1,875,000,000, on the assumption that the assessments of railroads were at cash value. Since 1905, the railroad assessments have not fallen off, but have increased seven or eight millions; a number of small properties have gone off the roll. The increase has been in the value of the same properties.

In the first year, the State Board attempted to make an equalization, and the equalized average rate then reached was \$13.62; the actual average rate that year was \$16.55, while the 1912 rate

was \$20.80, per thousand dollars of valuation. The State Board of Assessors in 1902 found the percentage of undervaluation of the general property of the state to be at 82%, or substantially 18% less than cash value. That action proceeded upon the assumption that the railroad properties were assessed at cash value and the other property at 82% of value. In the attempted equalization of 1905, the percentage of assessment of the general properties was found to be 84%, and the railroad properties were assumed to be at cash value.

The aggregate assessments of the railroad properties were, in 1902,

\$198,641,000, and in 1912, \$210,884,500. From 1902, the assessments of the general properties of the state have steadily increased. The State Board of Assessors, in making its railroad assessments, always has before it the inventories and appraisals of 1900, 1902 and 1905; they compare back and forth, and take into consideration all the elements that they can consider in valuing property. They have before them an abstract of the reports containing, in condensed form, the mileage for ten years, the equipment, cost of the road, cost of equipment, earnings, expenses, income sheet, balance sheet, previous assessed valuation, Cooley and Adams appraisals—every item of information it can give them—and additions and betterments, shown in a separate item.

The Board does not place any separate value on the specific items, but their attempt is to reach a value for the property. The value is really the agreement of the members of the Board, and may be a little more than the Cooley appraisal with additions and betterments, and sometimes a little less. The Board, in making its assessments, has before it the figures reported by the company as the value of its

property.

795 PARKER.

Cross-examination resumed:

I would not say the Cooley appraisal of 1900 was very good evidence of the value of a railroad in 1913, nor would the 1905 appraisal be, without additions and betterments. The value of all railroads is higher in 1912 than in the appraisal of 1900, and, in many instances, considerably.

PARKER.

Direct examination resumed:

The State Tax Commission has a large force of men at work in nine or ten counties endeavoring to bring them to cash value; they are now working in Marquette and Baraga counties, and last year

worked in Gogebic, Iron and Dickinson counties.

The general instruction is that they are to value these properties as near as possible to cash value. They go out and make the examinations (they are equipped with the sales), to verify the sales in the first place, the first and second parties, and the consideration, the parties to the paper, and to value all the property, real and personal. And they are instructed to inspect every piece of property on the assessment roll, and to discover omitted properties. They are expected to examine, and pass their judgment on, every piece of property. The report is filed with the Board, and it calls a review, if necessary. Gogebic County-was completed and reviewed last year, and the property placed on the roll.

(Mr. Eldredge makes detailed objection to the results, on the theory that the man investigating should be produced to prove the

values. Defendants' position is that values for assessment so fixed are evidence of the value of the adjacent railroad lands.)

796–7 I have tabulated the figures showing the values placed by the citizens' committee in Marquette on certain real estate there as an informal assessment, and also the assessments of 1911 and 1912. The tabulation shows a list of lands commencing at about the south city limits of Marquette and proceeding right through the city to the western limits, following the track as closely as possible; also the lands following the south track out of the city, and the lands following the Dead River branch, to the north. It shows the addition they are located in, the description as found on the assessment roll, the value placed on that same property by the informal committee, and the value at which said properties were assessed in 1911 and 1912.

The figures appearing in the last three columns are dollars. The descriptions are sufficient to identify the lands. I took the figures off the rolls, myself, and I intended they should be, and I believe they are, correct. I think the majority of the cases have buildings on, and they are included in the figures. The table is marked

Exhibit 27a.

By informal valuation is meant that made by a committee with regard to which plaintiff's witnesses, Robertson and Asire, were cross examined. (Mr. Eldredge makes detailed objection, on the ground that the figures are not official and have no more weight than any other hearsay evidence.) I found this informal roll in the office of the City Comptroller, in Marquette, and other figures for 1911 and 1912 were taken from the original assessment rolls. The State Board of Tax Commissioners is now making a valuation and assessment in Marquette County, having completed Marquette City. The law requires Michigan assessments to be at cash value. These rolls contain the usual certificates which state these assessments to be at cash value.

PARKER.

Cross-examination resumed:

Notwithstanding the law makes this requirement, it has not always been complied with. Until the State Board of Tax Commissioners took the matter in hand, cash value assessing had not been done, I think, anywhere in the state. The Tax Commission took the matter in hand seriously a number of years ago, and then there were a few years they were rather quiet, hindered by the fact that their powers were curtailed; the law now gives them ample power. I made up the Marquette list, myself, from the rolls. I think,

I made up the Marquette list, myself, from the rolls. I think, in general, you could follow the descriptions of the outlying property along the line of South Shore, from the south, right through to the west. The property in Marquette is either adjacent to the railroad property or was so situated as to, in my judgment, throw some light

on its value.

The Tax Commission was trying to get the property as close as possible to cash value. There is always a range of judgment, and somewhere between the ranges of judgment the truth lies. They don't want to get it over cash value, but endeavor to get cash value. I have not had an opportunity, personally, to know what they did to real estate values in Marquette; the records are not back here yet. The values now appear on the local assessment roll, and are accessible there.

PARKER.

Direct examination resumed:

The only case where real estate is omitted is where someone is exempted. The Tax Commission was very active from 1900 to 1905. During that time, many counties in Lower Peninsula—60% of them—were reviewed. One year, 20 counties were reviewed. Except on one or two special complaints, the general trend, where reviews have been held, has been upward. The assessments of the state from 1899 to 1905 were increased from \$968,000,000 to \$1,574,000,000, an increase of \$306,000,000. From 1905 to 1912, the increase was to \$2,078,694,409, or an increase of \$504,000,000. From 1902 to 1912, the increase was \$660,000,000.

I have attended reviews; the field men are present at them. In the last few years, there has been a placard at hearings, stating all property is to be assessed at cash value. I don't think there are any printed instructions to the men; frequently, we have taken them in for a school of instructions. I attended the last one, here, in December. At this meeting, the problems met in the work are talked over; the Commission gave its ideas regarding the work, and the

general instructions were cash value.

800 PARKER.

Cross-examination resumed:

Relatively, the Tax Commission has not been reducing the valuation of property reported by tax payers under oath below the figures represented in many cases; I know of two instances. I know of no instance where they did in a whole town. In the year in which they valued 21 counties, the force of men employed was 50 or 60, and they were engaged largely in verifying sales, etc. They took from the County records all of the sales, and interviewed one or both of the parties, verifying the sales and finding out the actual considerations.

Mr. Wykes: Mr. Eldredge, in the litigation referred to, in 1902, in the course of which the valuation of 1902 was made, will you concede that this litigation was in the Circuit Court of the United States for the Western District of Michigan, and that it was appealed to the Supreme Court of the United States, and that one of the claims of error of the complainant was as follows? The claim of appeal is this:

"The assessment in question in this case was upon the property of the complainant at its true cash value. The rate imposed upon the property of the complainant by the proceedings in question in this case was the average rate paid upon property in the State other than that included in said Act upon which ad valorem taxes were assessed for State, County, Township, School and municipal purposes. The evidence shows that such other property was uniformly intentionally and generally assessed at the time in question at eighty-two per cent (82%) of its true cash value; 17 per cent of the tax in question, therefore, should be set aside."

Mr. Eldredge: Objecting to the proof as irrelevant and immaterial,

I do concede it.

Mr. Wykes: I produce the record in the case of the Duluth, South Shore & Atlantic Railway Company against the Auditor 801 General, Perry F. Powers, being No. 477 of the October term of the Supreme Court of the United States of 1905, and ask to have it marked as Defts.' Ex. 26. That is the official printed

transcript.

Mr. Eldredge: Objecting to it as irrelevant and immaterial, I will concede that in that litigation the complainant here offered in evidence a communication from the State Board of Tax Commissioners to the State Board of Equalization, in which they set forth that they had determined the percentage of true cash value as compared with the assessed valuation in certain townships, as follows:

Alger County:

A (T	
Au Train	75.0%
Burt	80.0%
Limestone	75.0%
Making	10.0%
Mathias	70.0%
Munising	90.0%
Onota	90.0%
Dool Diver	30.0%
Rock River	75.0%
Baraga County:	
Arvon	52.6%
Rarage	50.10
Baraga	50.1%
Covington	57.2%
I.'Anse	43.0%
Smire	
Spur	48.2%
Chippewa County:	
Sault Ste. Marie Township	65.0%
Dafter Township	65.0%
Cuparion Town Air	00.0%
Superior Township	75.0%
Trout Lake Township	60.0%
Sault Ste. Marie City	
must be saute bity	100.0%

Gogebic County:	
Bessemer City	66.8% $56.3%$ $50.0%$ $37.9%$ $87.5%$
Houghton County:	*
Chassell Township	51.9% 54.3% 48.7%
Luce County:	05 000
Columbus Township	$65.0\% \\ 75.0\% \\ 60.0\%$
Mackinaw County:	
Brevort Township Hendricks Moran St. Ignace St. Ignace City	
Ontonagon County:	
Haight Interior Matchwood McMillan Rockland	38.1% $44.4%$ $34.2%$
Schoolcraft County:	
Manistique Township Germfask Seney	22.8%

It is stated that these percentages do not include the assessed valuation of several mines.

Mr. Wykes: Will you admit that at the time of the litigation Mr. Dust was a member of the State Boards of Tax Commissioners and Assessors and was called as a witness for the complainant?

Mr. Eldredge: Yes.
Mr. Wykes: Will you admit that he testified that the State was assessed at from 85% to 90% of its value?

Mr. Eldredge: I will admit that upon cross examination Mr. Dust testified that he had no knowledge of any county in the state which

was, in 1902, assessed as low as 30%, saying, "I don't think there was any assessment as low as 30% in 1902, giving your best estimate," and he said, "Well, I should think from 85% up, 85% up to 95% or 96%, or along in there."

Mr. Wykes: Will you admit that two of the other commissioners-Freeman and Savre-made affidavits on behalf of the com-803 plainant to the effect that the state was assessed at above 80%

of its cash value in 1902?

Mr. Eldredge: It is understood, Mr. Wykes, that all of these admissions are subject to my objection that the testimony offered is irrelevant and immaterial.

Mr. Wykes: Yes.

Mr. Eldredge: I will admit that in that litigation Tax Commissioner, Freeman, said, in an affidavit made on behalf of all the different complainants in the litigation referred to, that the total true cash value of the property of the state of Michigan, other than that subject to assessment by the State Board of Assessors, were, according to the information and knowledge of said Freeman, assessed at 82.7% of the true cash value thereof, and that Commissioner Sayre, in a like affidavit, said exactly the same thing.

Mr. Wykes: Will you admit that that affidavit was prepared for

these men by complainant's attorney?

Mr. Eldredge: If the record shows it, I will admit it.

PARKER, recalled.

804

Further direct examination.

By Mr. Wykes:

The State Board of Tax Commissioners has informed the State Board of Equalization every five years of the cash value of the state, as determined by them; to get the data on which to advise, a systematic investigation was carried on; the advice was submitted, generally, in the form of a report. The State Board of Equalization met in 1911, and the State Board of Tax Commissioners made a report to it that year. The getting together of the data upon which that report was based took most of 1910 and to the middle of August, 1911,

with a force varying from 60 to 80 men, and, at times, 100.

Q. What was the method of their investigation?

A. The first step was to take from the County records, or the records in the office of the Register of Deeds, a transcript of the sales that had taken place in two or three years. Those sales were then classified; I mean, by that, they were taken and sorted over with a view of getting rid of all dollar considerations, with a view of eliminating, as far as possible, all transactions that appeared to be family transactions, between relatives and families, with an idea of getting only straight sales to use in its investigation. In a great many counties, they made personal investigation with their men, verifying these considerations stated in the papers, verifying from one party or the other, the party that sold or the party that purchased the property. In other counties, they confined their attention to simply an investigation of the sales or a computation based on the sales as compared with the assessed valuations. In all of the counties, they compared the sales with the assessed valuations of the same properties that were

involved in the transactions.

The purpose of the recourse to sales was to establish the sale value of the property. (The witness produced a copy of the report of the State Board of Assessors, based upon the data thus gathered for 1911.) The percentages reported for the several counties traversed by the D. S. S. & A. were:

Alger																							
Baraga										 		,						. ,	. ,				44.1%
Gogebic								 		 					9					,			22.7%
Houghton .									. ,	 													76.4%
Marquette								. ,		 						a				9			37.0%
Ontonagon .										 								. ,					37.5%
Chippewa								 		 													59.3%
Mackinaw .								. ,		 								. ,					43.4%
Luce										 													56.5%
Schoolcraft .										 													34.8%

The report states the method of collecting the data, and the number of sales examined.

Q. Read that part of the report, will you, please?

A. "General property. Transcripts of all real estate transfers evidenced by warranty deed, covering a period of 3 years, were taken from the records in the offices of the various registers of deeds throughout the State. The number of transfers so taken was over 200,000 and included all recorded within the period mentioned. consideration named in each of these sales was then compared with the assessed valuation of the same property and these records were then taken to the office of the Board and the data properly assembled; only such transfers were used in making compilations as upon examination and investigation were found to be bona fide sales. The per cent of assessed to actual value for each county was then determined. based upon the considerations in the various deeds, and the assessed value of the same properties; this per cent was then applied to the total assessed valuation of both real estate and personal property in The Board in so far as it has been able to do so with the the county. force at its command, has examined and verified the transfers referred to."

The report is a printed public document. Personal property did not enter into the percentages; they were determined on real estate. The percentages arrived at and reported for the different townships

through which the line of the South Shore runs were:

Alger County:

Au Train	
	40.2%
	55.5%
Rock River	46.7%

Baraga County:	
Baraga Township Covington 1.'Anse Spur	54.2% $34.5%$ $43.3%$ $49.3%$
Chippewa County:	
Bay Mills (No percentage arrived at) Superior Township Trout Lake Sault Ste. Marie City Sault Ste. Marie Township 806	65.58% 44.47% 74.43% 59.7%
Gogebie County:	
Bessemer Township Ironwood Township Wakefield Township Bessemer City	49.33% 34.24% 40.71% 43.27%
Houghton County:	
Chassell	$28.03\% \\ 33.92\% \\ 47.26\%$
Luce County:	
Columbus Township	$26.70\% \\ 38.05\% \\ 41.77\%$
Mackinaw County:	
Brevort	35.48% $45.35%$ $36.17%$ $52.69%$ $53.71%$
Marquette County:	
Chocolay Ely Humboldt Ishpeming Township Marquette Township Michigamme Township Michigamme Township Negaunee Township Republic Township Sands Township Tilden Ishpeming City Negaunee City Marquette City	49.8% 14.1% 41.7% 22.8% 34.9% 31.5% 27.5% 45.3% 12.1% 55.7% 40.5% 62.7%

The townships in Marquette County through which the road does not run shows percentages as follows:

			-																				00
Forsythe .				*									, ,			٠		 		4			31
Powell																		 					31
Richmond										9											4		0=
Skandia .						*	*					 			*		 					4	
Turin					. ,																		91
Walla																		 					40
West Bran	eh															9							32

The percentages for townships in Ontonagon and Schoolcraft counties through which the road does not run are as follows:

807 Ontonagan County:

Haight								 									 					30.19%
Intorior																	 					-1.00 70
McMillon											-											10.02/0
Matchwood												_						 				23 00 70
Stannard	 	. ,	 				*		. ,	. ,			*								*	22.20%

Schoolcraft County:

Germfask				 											*					26.91%
Cusina													 							22.00%
Sanay						_														20.00%
Manistique																		*		20.11%

Previous to the meeting of the State Board of Equalization, in 1906, information and data on sales were collected by the Tax Commission for the report to the State Board of Equalization. The data collected for the 1906 report did not enter into the 1911 report; we simply used sales in the three-year period preceding it. Report to the State Board of Equalization for 1911, being official report, pro-

duced and marked Defts.' Ex. 26.)

I have taken from the original assessment roll of the townships and municipalities traversed by the track, as near as I could ascertain them from the condensed profile, and entered upon an exhibit, the description, name of owner or occupant, acreage and assessed values; I took them all from the tax roll, using care to see that they were correctly taken off. The list begins at Sault Ste. Marie, mile post 2.80, and runs straight across the state, with the exception of a few cities and villages. (Tabulation marked Defts.' Ex. 27.) The list is so made that I can divide the different sections into the different municipalities.

Q. What have you done towards or in the way of affecting the assessed values with the percentages indicated by the Tax Commission's investigations for the different townships in which the descriptions

lying along the right of way appear?

A. I simply totaled the assessed valuation for each municipality as shown here, grouped by mile posts, and applied the percent-

ages which I have just read into the record, or the per cents which I have read into the record, to such assessed valuation, and then, in that way, determined an actual value, and that actual value I have divided by the total acreage affected, and determined from that an acreage price for each municipality. I may have two divisions of acreage and acreage prices for one municipality, but it is assembled by mile posts. What I tried to do is to reduce the figures for a township to a total, embracing only the descriptions abutting on or lying adjacent to the railroad; if I didn't, it is in exceptional instances.

A summary of the assessments that appear later in Ex. 27 shows, by columns, county, civil division or municipality, South Shore mile posts, value per acre, based on Tax Commission's per cents, that column being subdivided to show acreage prices assessed, and actual prices based on percentages. Ex. 27 shows, for each township assessed, the value of the lands taken, and the actual value, found by applying the Tax Commission percentages, as reported to the State

Board of Equalization, to the assessed value.

This summary comprises the first four sheets of Defts.' Ex. 27; the fifth and sixth sheets show the counties, percentages of assessment in townships, the acreage that enters into the computation, its assessed value, the average assessed value of the acreage, and the actual value as determined by the application of the percentages to the total assessed value; that is also indicated by mile posts, and the average actual value per acre for the county is shown. I find the actual value per acre by counties, produced in that way, to be:

	Chippewa \$8.05
	Luce 7.54
	Schooleraft 5.01
	Alger 6.84
809	Marquette 9.18
	Baraga 11.15
	Houghton
	Ontonagon 12.85
	Gogebic
	Mackinaw 7.07

The computations on pages 1 to 6 inclusive of Defts.' Ex. 27 are my own, and I believe they are correct. Page 7 is the actual detail from which is made the information shown on the summary, comprising the descriptions and values taken from the local rolls, from the exhibit; the amounts arrived at as the value of the lands along the South Shore, computed through the use of the percentages used, are:

From— 2.80 4.10 8.25 9.20 12.15 12.70 28.85 39.20 152.10 156.55 163.45 172.00 174.05	810	Mile	Mile posts.	on tax com. per cent.	on tax com. per cent.
ain line): 2.80	Civil division.	From-	To-	Assessed.	Actual.
2.80 4.10 \$12.70 \$1 8.25 9.26 6.27 1 8.25 9.20 6.25 1 12.15 12.15 5.22 1 12.15 12.70 28.85 4.65 1 28.85 39.20 6.84 1 39.20 45.48 4.09 1 139.66 151.95 2.60 1 151.95 152.10 2.50 1 156.55 159.75 5.72 1 156.55 169.75 5.72 1 163.45 1.86 1 172.00 174.05 2.98 1 172.00 174.05 2.98 1 180.35 184.30 5.47	Chippewa County (main line):				
# 1.10	Coult Cto Manie City	2.80	4.10	\$12.70	\$17.48
8.25 9.20 6.25 1 12.15 12.15 5.22 12.15 12.70 12.70 28.85 4.65 28.85 39.20 6.84 1 39.20 45.48 4.09 151.95 152.10 2.50 152.10 156.55 156.55 159.75 5.72 1 158.75 163.45 1.86 172.00 174.05 2.98 174.05 180.35 3.25	Sault Sie, Marie Chy.	4.10	8.25	6.27	10.50
9.20 12.15 5.22 12.70 28.85 4.65 12.70 28.85 4.65 28.85 39.20 6.84 1 39.20 45.48 4.09 151.95 152.10 2.50 152.10 156.55 159.75 5.72 1 156.55 159.75 5.72 1 156.55 159.75 5.72 1 156.55 159.75 5.72 1 163.45 1.86 172.00 174.05 2.98 174.05 180.35 3.25 180.35 184.30 5.47	Bault Ste. Marie Iownship	8.25	9.20	6.25	12.50
ain line): 12.15 12.70 28.85 4.65 28.85 39.20 6.84 1 39.20 45.48 4.09 151.95 151.95 2.60 152.10 156.55 159.75 5.72 1 156.55 159.75 5.72 1 163.45 1.86 172.00 174.05 2.98 174.05 180.35 184.30 5.47		9.20	12.15	5.22	8.75
ain line): 12.70 28.85 39.20 45.48 4.09 39.20 45.48 4.09 151.95 151.95 152.10 156.55 156.55 156.55 158.45 172.00 172.00 172.00 174.05 180.35 184.30 5.47		12.15	12.70	0 0	
ain line): 139.26 45.48 4.09 139.66 151.95 2.60 152.10 156.55 156.55 159.75 5.72 1 156.55 159.75 5.72 1 158.45 1.86 172.00 174.05 2.98 174.05 180.35 3.25		12.70	28.85	4.65	7.79
main line): 139.20 45.48 4.09 139.66 151.95 2.60 152.10 156.55 156.55 159.75 5.72 1 156.55 159.75 1.86 153.45 1.86 172.00 174.05 2.98 174.05 180.35 3.25		28.85	39.20	6.84	10.42
139.66 151.95 2.60 151.95 152.10 2.50 152.10 156.55 5.72 156.55 159.75 5.72 159.75 163.45 1.86 163.45 172.00 174.05 2.98 174.05 180.35 3.25 180.35 184.30 5.47	Sault Ste. Marie Township.	39.20	45.48	4.09	6.86
ip. 139.66 151.95 2.60 151.95 152.10 2.50 152.10 156.55 156.55 159.75 5.72 163.45 1.86 172.00 174.05 180.35 3.25 180.35 184.30 5.47	Marquette County (main line):				
ip. 151.95 152.10 2.50 152.10 156.55 ip. 156.55 159.75 5.72 1 ip. 158.45 1.86 1.86 ip. 163.45 172.00 in. 172.00 174.05 2.98 in. 174.05 180.35 3.25 180.35 184.30 5.47	Chambin	139.66	151.95	2.60	5.22
inp. 152.10 156.55 156.55 159.75 5.72 1 159.75 163.45 1.86 163.45 172.00 172.00 174.05 2.98 174.05 180.35 3.25		151.95	152.10	2.50	5.23
156.55 159.75 5.72 1 159.75 163.45 1.86 163.45 172.00 172.00 174.05 2.98 174.05 180.35 3.25 180.35 184.30 5.47	*	152.10	156.55	:	•
159.75 163.45 1.86 163.45 1.72.00 172.00 174.05 2.98 174.05 180.35 3.25 180.35 184.30 5.47		156.55	159.75	5.72	16.38
163.45 172.00 172.00 174.05 2.98 174.05 180.35 3.25 180.35 184.30 5.47		159.75	163.45	1.86	7.04
172.00 174.05 2.98 174.05 180.35 3.25 180.35 184.30 5.47		163.45	:		
172.00 174.05 2.98 174.05 180.35 3.25 180.35 184.30 5.47		:	172.00		•
174.05 180.35 3.25 180.35 184.30 5.47		172.00	174.05	2.98	8.73
180.35 184.30 5.47		174.05	180.35	3.25	6.79
	hin	180.35	184.30	5.47	13.13

Michigamme Township			00.0	0.33
	187.30	193.20	2.62	8.31
	93.20	193.66		:
Mackinaw County (St. Ignace branch):				
Moran Township	1.30	3.75	3.30	9.13
St. Ignace Township.	3.75	4.65	3.60	6.70
Moran Township.	4.65	8.05	2.03	5.61
Brevort Township	8.05	10.20	3.74	10.54
	10.20	11.20	:	
Brevort Township.	11.20	19.00	3.05	8.59
Moran Township	19.00	24.39	2.08	5.76
Marquette County (south track):				
Marquette Township	2.80	3.30	0.00	17.18
Sands Township.	3.30	3.55	5.96	20.95
Marquette Township	3.55	6.60	4.83	13.85
Negaunee Township.	6.60	9.75	2.74	9.95

actual	value per acre																			\$9.18	
	Actual value.		200	\$11,827	8,368	14,312	10,090	2 167	14,409	14,400	14,028	8.508	11 441	11,441	1	101,2	076	13,181	15,727	2198 793	4100,000
	Average	her acre.		\$2.60	2.50	5.72	1 86	00.0	2.90	3.25	5.47	90 %	00.00	2.62		6.00	5.96	4.83	2.74	00 00	\$0.00
S. Carrier and T. Car		Assessed.		\$5,890	400	4 995	000,1	2,110	1,080	6,885	5.850	2020	4,700	3,604		096	140	4.600	4,325	000000	\$46,568
		Acreage.		2,264.50	160 09	100.00	10.019	1,433.92	362.52	2.120.00	1 088 77	1,000.11	952.87	1,377.55	••	160.00	73.78	951 99	1,580.00		. 14,021.36
	Tax	per cent.	(main line):	49.80	00 27	91.00	34.90	27.50	34.10	47 80	02.11	41.70	56.00	31.50	Marquette County (south track)	34.90	47.80	00.10	27.50	,	Total Marquette County
		To-	quette County	151 95	101.00	152.10	159.75	163.45	174.05	100 25	100.00	184.30	187.30	193.20	rquette County						Total Marqu
=======================================	Mile posts.	from-	Mar	00 00	00.00	51.95	56.55	59.75	29 00	20.71	174.00	180.35	184 30	187.30	Mar						

	\$7,888	13,602	34,117	5,496	5,570	1,341	6,455	\$64,469
	*							\$5.02
	\$1,680	4,920	12,105	1,950	2,015	720	2,335	\$45,725
branch):	360.00	2,361.44	3,973.34	521.03	993.05	200.00	707.15	9,116.01
(St. Ignace	45.35	36.17	35.48	35.48	36.17	53.71	36.17	w County
lackinaw County	34.15	19.00	11.20	10.20	8.05	4.65	3.75	Total Mackinaw
Mac	32.62	24.35	19.00	8.05	4.65	3.75	1.30	

Shore right of way. These cales were taken from the offices of the Register of Deeds, and part of them by the men of the Tax Commission, and part of them were furnished me later by Registers in certain counties. The sales cover, in general, from 1907 to late in 1911. A part of the sales that were gathered by the Tax Commission men were gathered during their work in preparation for the State equalization in 1911, and, so far as I had opportunity, I got sales from other Registers to supplement those sales and bring them up to date.

Where sales indicated on their face that they were either family or dollar considerations, they were thrown out. The Tax Commission sales had been verified, investigated and examined. I have compiled the sales by townships and counties along the railroad, arranging them in two belts, the first five miles on each side of the track and the second one mile on each side of the track; the sales are all of rural

property. (Compilation marked Defts.' Ex. 30.)

By Defts.' Ex. 30 I arrived at \$30.97 per acre for lands in Sault Ste. Marie Township; the sales in that township were in 47-1, which is close to, and in part in, the city; the furthest distance from the city of those descriptions is two miles, and some of them are right up to the limits. In the results in Defts.' Ex. 30 no attempt was made to separate the transfer into buildings and lands; by taking one or two buildings, it will materially increase the average figure, depending on the number and size of the descriptions, price, cost of improvement, etc. There is nothing in the exhibit or transfers to show whether the land is improved.

(Proceedings of the State Board of Equalization, 1901 and 1906, contained in printed publications of the State, produced, marked Defts.' Exhibits 31 and 32, and offered in evidence.)

Mr. Wykes: I produce copies of acceptance of land grants by the Bay de Noquet and Marquette Railroad Company, by the Marquette and Ontonagon Railway Company, and No. 3 is the Houghton and Ontonagon Railroad Company.

Mr. Eldredge: The plaintiff admits that they are correct copies of the documents which they purpose to represent, and objects to

them on the ground of irrelevancy and immateriality.

(Papers referred to marked Defts.' Exhibits 33, 34 and 35.) Ex. 33 acceptance by Bay de Noquet and Marquette, contains the following

clause:

"Resolved, That the Bay De Noquet and Marquette Railroad Company do hereby accept the lands, franchise of rights and powers and privileges, conferred upon said Company by an act of the Legislature of the State of Michigan Entitled, An Act disposing of certain grants of land made to the State of Michigan for Railroad purposes by act of Congress approved June 3, 1856, approved February 14, 1857, and the said Company do hereby agree and assent to the provisions and requirements of all the terms and conditions and provisions imposed by the same."

Defts.' Ex. 34, acceptance by Marquette and Ontonagon, contains

the following paragraph:

"That the Marquette and Ontonagon Railway Company does hereby accept the lands, franchises, rights powers and privileges conferred by an act of the Legislature of the State of Michigan, entitled an act disposing of certain grants of land made to the State of Michigan for Rail Road purposes by act of Congress, approved June 3, 1856, approved February fourteenth A. D. 1857, and that said Company hereby agrees & assents to the provisions and requirements of said act."

(Defts.' Ex. 35, acceptance of Houghton and Ontonagon Railroad Company.)

I have made an abstract of the reports of the South Shore Land
Co. in the office of the Secretary of State for the years 1904
to 1913 inclusive. That abstract takes all the figures reported,
and is correct. (Paper marked Defts.' Ex. 61—three sheets.)

On April 25, 1914.

PARKER recalled.

Further direct examination.

By Mr. Wykes:

The Iroquois Hotel site at the Soo was about one-eighth of a mile east of the South Shore station, on Portage Ave., and towards the business part of town—nearer the business part of town than the station.

(Mr. Wykes produced a copy of a printed report of the State Boards of Tax Commissioners and Assessors for the years 1911-1912, which was marked Defts.' Ex. 62.)

(The printed copy of the report of the Mackinac and Marquette R. R., found on page 77 to 88 of the printed report of the Commissioner of Railroads for 1887, and covering the period from Oct. 20

to Dec. 31, 1886, is marked Defts.' Ex. 63.)

(Defts.' Exhibits 53 to 63 inclusive offered in evidence, subject to the previous objections of Mr. Eldredge, who further objects to Defts.' Ex. 63 as irrelevant and immaterial, and also that the paragraph headed "remarks," on page 78, is not a part of the railroad company's report at all, and that, therefore, the language has no tendency to prove the facts therein stated.)

(Mr. Wykes produced the printed annual report of the Commissioner of Railroads for 1889, covering the year ending Dec. 31, 1888, and, subject to Mr. Eldredge's objection to it as irrelevant and im-

material, read from page xlvi thereof, as follows:)

815 "Duluth, South Shore & Atlantic was not inspected until October. The Mackinaw and Marquette division of this line has never been remunerative, and the long stretches of swamp through which it runs, where there is no ballast, has made it difficult and expensive to keep up. It has been built long enough so that bridges, culverts, and ties need renewing, and all need it now.

Many repairs had been made, and were still being made, so that the track is now safe. With the present energetic management it is believed that a more favorable report will be due next year.

"The M. H. & O. division and the Marquette & Western portions of this line are in much better condition and the public have little

cause for complaint.

"The new line from Nestoria to the State line was built by contract, and was not constructed as well as railroads usually are by parties who expect to operate them. Under the present efficient management, however, the road has been improved to a large extent, and has been done in a very substantial manner. The road is now safe and the track is in excellent shape for a new line through what was a little more than two years ago an unbroken forest. The road forms a part of a through route from Duluth to the seaboard, and will be an important factor in the question of transportation from the northwest to Atlantic ports."

(Mr. Wykes produced a certified copy of the stenographic reports of the several hearings in review of the property of plaintiff before the State Board of Assessors, for the years 1903, 1904, 1905 and 1907, which was marked Defts.' Ex. 64. Mr. Eldredge objects, on the grounds that they are arguments made by an attorney in the course of his emploment, that they are not proved, and that they have no evidential force, since they could only be proved by the man who took the notes being produced and an opportunity given for cross

examination.)

Mr. Wykes: From Defts.' Ex. 26, pages 129 to 131, I wish to read into the record the statement of Mr. F. H. Vandenboom before the State Board of Equalization, representing Marquette County.

Mr. Eldredge: I object to that, for the reason that the statement is obviously self-serving, that it is pure hearsay, and that it has no tendency to prove values, and that it deprives us of the power of

cross examination. The Master: Do you claim that this is competent evidence 816 to prove the value of these lands in connection with this

case? Mr. Wykes: I do claim, your Honor please, where a railroad company puts in value for its property by paid experts, and on the behalf of the State other values are shown, and where they widely differ, you can take the statements of officials made in official capacity for the purpose of confirming one or the other, where it is a general proposition, as this is,

Mr. Eldredge: Who do you refer to when you talk about "paid

experts?"

Mr. Wykes: I refer to any expert who is paid—Mr. Riggs, for example, or whoever else was called.

Mr. Eldredge: I will put on record that we will not claim anything for the value of land on account of Mr. Riggs' statements.

Mr. Wykes: At least, they will be admissions against you, and I intend to use them as such. Mr. Riggs' statements on certain of this land I intend to use as admissions by the railroad company.

(Mr. Wykes reads into the record the statement of F. H. Vanden-

boom before the State Board of Equalization. The statement is found on pages 129 to 131 of Defts.' Ex. 26. The following is an excerpt

therefrom:)

817

I represent Marquette-at least, the eastern portion of it-and am not here to plead poverty nor to appeal for mercy. We come before this Board simply to show something of our actual values in at least the eastern end of Marquette County. I have no idea how the State Tax Commission arrived at the large values that they have put on the agricultural land, the cities, and the timber part of our county.

I have lived in Marquette County for 39 years, and know something of it, except the mines. About 25% of our land still contains standing timber, about 40% is cut-over, about 30% is rock and sand plains, and about 5% is agricultural land. I have made a careful estimate of the agricultural land, and only one-fifth of it is under cultivation. We have chopped-over land there for settlers,

and we hope to get them in, but will not be able to do so by

doubling or tripling the valuation.

In getting at values, I have figured the farm land roughly at \$10 an acre, because you can buy farm lands anywhere in the near vicinity of the larger towns or cities at that price, and the lands farther back that are tillable are held at only half that price. I have tried to bring this value up, to see if I could get it anywhere near the Tax

Commission, but I have utterly failed.

On our rock and sand plains, I have figured those lands at \$3.33 an acre, which would give us a value on those lands of \$1,000,000. I daresay any man with half a million can take them. They are not valuable for any purpose, so far as I know, except to build a road across, to haul the products to somewhere else. The 40% of cutover lands we have put at \$5 an acre, or \$2,000,000, as their actual value. Now, I think we have figured thoroughly high when we placed those cut-over lands at \$5 an acre, and lots of it has been bought at \$5 an acre and sold over again for the same money, and, in lots of cases, less. The 25% of timber land I have figured at \$10 an acre, or \$2,500,000, taking them together, whether near to or far from the railroad. This is fairly high, as the timber on it is mixed.

The city of Marquette is assessed at \$6,700,000, and I daresay, if you took from it the city hall, the court house, and its churches, that the whole city could be bought for that money, for I know of several instances where property has been sold for exactly what it was assessed for, and in some cases less. I sold a small piece of Another good loproperty for \$1,000 which was assessed at \$1,000. cation sold last year for \$750, while it was assessed at \$800. Lots within a fourth of a mile of the post office, which were held a few years ago at \$800, can now be had for \$500.

The Tax Commission figures may be based on sales made for speculative purposes. For instance, I bought property at about \$7.50 an acre and sold it for \$30 to \$50, to the Longyear and Ayers estate. They had to have it, but their scheme has now fallen through, and I bought property adjoining it for \$10 an acre.

bought 80 acres of land-40 of which had timber, and 40 of which

cost the owner \$2,500 to clear-for \$500 for the 80 acres.

I will say to this Board that all we want is to be justly equalized and fairly treated; but, in regard to values, I will say that the Tax Commission has put our values entirely too high, because the value is not there. Now, some people have come in since I have been there and said that it was the Supervisor's business to keep his tax roll down as low as possible. This is not true of the Upper Peninsula.

The Supervisor has made an effort to keep his tax roll sufficiently high so one-half of 1% which he could raise for highway purposes would give him sufficient money for highway work, and the farmers are particularly anxious that they should raise a reasonable

sum for highway purposes, because nearly all the work, until the county road system came in, has been done by the farmers; so the farmer is perfectly willing to pay his share of an increased valuation, in order to make the land companies that own the bulk of the land pay their share, and he gets the entire amount of highway taxes back in his own hands by doing the labor when he has tome to do it. It is just like having it handed over, and so the Supervisor in the Upper Peninsula makes an effort to have his tax roll as high as possible. In fact, the tax roll of my own township has stood for years at approximately \$200,000. Only a few years ago, there were several thousand acres taken off from our township to form what is known as Buell Township. Not one cent went off from our roll. We immediately raised the timber lands and farming lands sufficiently to still leave our roll at approximately \$200,000.

I counted \$500,000 for the farming land, which I think is ample. I think that the Tax Commission's estimate on our county is 100%

more than the property is worth.

On May 5, 1914.

PARKER recalled.

Further direct examination.

By Mr. Wykes:

I asked Mr. McCormick to prepare the figures which he gave in his testimony, showing the operating ratios and the expenses under the different general classifications for the different railroad systems that he enumerated. I directed him to take system figures for other roads or systems than the South Shore, because we don't place any dependence on the division of operating expenses and earnings. They are not in a uniform manner, and there was one figure that we could depend on, and that was the system figure. The divisions to states are not made uniformly or on the same basis in the different reports.

I have never had all the data necessary to ascertain what the real expenses in Michigan were where the road was in different states. Here, in our work, the law requires that we are guided by track mileage in Michigan, and we use that as a rather rough and ready method

of dividing the earnings and expenses to Michigan for our purposes, here. Occasionally, the different reports state the basis of the division of these operating expenses between Michigan and other states. Some of them have been done on a track mileage basis, and others on a revenue train mileage basis; others are stated merely as proportional, without stating what the proportion

is: then, again, others do not say what the method is.

At your request, I have prepared a table of figures, from the South Shore reports for various years, showing the amounts expended for labor, and the averages paid employees. The data was taken from the reports to the railroad commission for the years 1908 to 1913 inclusive. The compilation shows the number of men employed, and the days worked, the compensation paid, and the average per day, for each of the years mentioned, subdivided further as to the classification of operating accounts to which these men were supposedly charged—really, into five grand divisions of the operating expense account, although they have included one other in some of the years, being outside operations. The figures which I have compiled are as follows:

820 Account.	Number of men.	Days worked.	Compensation.	Average per day.	002
Maintenance of Way & Structures	433	158,730 116,885	\$281,837.51 235,578.45	\$1.78 2.02	и. о
Maintenance of Equipment Traffic Expenses. Transportation Expenses.	741 67	962 265,994 23,624	3,840.00 675,786.30 79,264.21	2.54 3.36 . : 36	. 0
Outside Operations	1,561	566,195	\$1,276,306.47	\$2.25	
Maintenance of Way & Structures	359 293	131,240	\$213,513.60 218,693.59	\$1.63 2.04	
Maintenance of Equipment Traffic Expenses. Transportation Expenses. General Expenses.	£ 158	1,022 229,297 23,213 9,900	4,020.00 578,557.22 79,131.63 17,081.05	2.52 3.41 1.73	
Outside Operations	1,389	501,801	\$1,110,997:09	\$2.21	
1910: Maintenance of Way & Structures	527	160,913	\$269,052.46 951.039.19	\$1.67	
Maintenance of Equipment Traffic Expenses. Transportation Expenses. General Expenses.	889 3 12,	273,775 23,447 21,021	3,933.47 707,230.97 77,075.87 12,636.88	3.85 3.29 1.62	
Outside Operations	1 805	587.824	\$1,320,968.84	\$2.25	

. Account.	Number of men.	Days worked.	Compensation.	Average per day.	
Maintenance of Way & Structures	495	153,237	\$262,643.05	\$1.71	
Maintenance of Equipment	383	111,199	5,060,00	4.00	
Traffic Expenses.	688	262.654	700,738.55	2.67	
Conough Evropses	20	25,484	48,578.45	3.35	
Outside Operations.	27	7,778	12,444.94	1.60	
	1.868	561,616	\$1,298,785.37	\$2.31	
1912:					
Mintenance of Wow & Churchings	673	166.418	\$285,450.85	\$1.72	
Maintenance of Positioners	405	114.320	240,379.24	2.10	
Maintenance of Equipments	110	1,573	6,110.00	3.88	
Transcortation Progress	914	263,400	717,430.53	2.72	
Transportation Expenses	7.5	27,240	80,433.44	2.95	
Outside Operations.	31	7,720	12,624.89	1.64	
	2,097	580,671	\$1,342,428.95	\$2.31	
1913:					
Meintenance of Wow & Structures	571	177.407	\$327,694.59	\$1.85	
Maintenance of Feminment	440	126,147	272,390.21	2.16	
Maintenance of Equipment.	15	1,703	6,659.04	3.91	
Transcontain Persons	1 079	294,382	815,460.73	2.77	
Canad Europeas	61	23,061	61,168.84	2.65	
Outside Operations.	65	9,555	15,135.71	1.58	
	2,189	632,255	\$1,498,509.12	\$2.37	

that was a simple average of the aggregate of the number of days of work of the men in any one of these departments—for instance, say, maintenance of way and structures, by dividing the aggregate compensation by the number of days' work we have the average per day. It is a simple arithmetical average. Then I got an average per day for the whole amount of labor. It is the actual average compensation paid. For 1908, 1909 and 1910, it is the average of 551,940 days for total compensation of \$1,236,090; that is really a weighted average. I have prepared the same kind of an average for the three years, 1911, 1912 and 1913. (The witness read compilations into the record, as follows:)

Account.	Number of men.	Days worked.	Compensation.	Average per day.
Average for years 1908, 1909, and 1910:				
Maintenance of Way & Structures	440	150,294	\$254,801.19	\$1.70
Maintenance of Equipment.	316	114,963	235,103,75	2.05
Traffic Expenses.	ಣ	1,002	3,931.16	3.53
Transportation Expenses	740	256,355	653,858.16	2.55
General Expenses.	29	23,428	78,490.57	3.35
Outside Operations	18	5,898	9,905.97	1.63
Average for years 1911, 1912, and 1913:	1,584	551,940	\$1,236,090.80	\$2.21
Maintanana of Way & Structures	086	165 687	\$291.929.50	81.76
Maintenance of Equipment	408	117.222	248,696.61	2.12
Traffic Expenses.	10	1,513	5,943.01	3.93
Transportation Expenses.	096	273,479	744,543.27	2.72
General Expenses.	89	25,262	75,393.58	2.98
Outside Operations	30	8,351	13,401.84	1.60
	2,051	591,514	\$1,379,907.81	\$2.33

822 PARKER.

Cross-examination.

By Mr. Eldredge:

My directions to Mr. McCormick were simply to get representative railroads of Michigan, and to take the system figures only, with the exception of South Shore. The D. C. & W. has only been operating about two years, and transportation expense would be about the only The D. T. & S. L. runs from Detroit normal expenses which it had. to Toledo. Its traffic is entirely freight, and it has a good tonnage. It is not a road that ought to be compared with normal roads, unless you were using all of them together, possibly, to get a representative system out of them.

I averaged the expenses of employees by taking the three years and aggregating the days' work and the compensation, and then divided those aggregates, which gave me the average per day. That average is a weighted average, because it isn't applicable so much to the one group of laborers, but is the actual true average of the wages paid

to all of the men.

On June 4, 1914.

PARKER recalled.

Further direct examination.

By Mr. Wykes:

I assisted in the preparation of Defts.' Ex. 72, Thompson, from inception to conclusion. I assisted in procuring the data, working the ratios and applying the method of Mr. Thompson, having a hand in and knowledge of every step. Ex. 72 correctly carries out the Thompson plan or method for the division of expenses as applied to plaintiff's accounts.

I have just (June, 1914) completed an investigation of plaintiff's books, to procure data to apply the same plan to the accounts of plaintiff for the year ending June 30, 1913. I have worked

out the ratios necessary in the application of that plan to the accounts of 1913, giving the same numbers to the same ratios as in 1912. I followed, throughout, substantially the same method as was applied in 1912, and, where I deviated from that method. I

will mention it; otherwise, it will be the same as in 1912.

The gross ton miles were obtained as in 1912, except that in 1913 we had access to the individual locomotive mileage in Michigan, and used the individual mileage against the locomotives making it, whereas, in 1912, by reason of having the system mileage of locomotives, the locomotive ton miles was determined by average weights. In other respects, the computation of the gross ton mile ratio was the same in 1913 as in 1912, with the exception that in 1913 there was no computation for mileage on the Mineral Range.

The reacon for making the computation for mileage on the Mineral Range in 1912 was that there was three months' operation of those tracks, the mileage of which was included in the mileage of South Shore trains. The contract changed about Oct. 1, 1912, and no mileage has been computed for the Mineral Range since. During the three months of 1912, plaintiff paid for the operations of those trains and received the revenue; subsequently, it paid for the operation of the trains, but did not receive the revenue.

Plaintiff does receive what you might call wheelage, or track rental; that is received from the C. & N. W. and C. M. & St. P. for mileage on its tracks and the Mineral Range. Plaintiff now absorbs any other revenue from those sources. During the three months of 1912, and

before, plaintiff paid the Mineral Range 40¢ a train mile.

For Ratio 2, where in 1912 we made allocations and assignments of the track, in 1913 we took Complt.'s Ex. 1a, Riggs, and used the Riggs allocations bodily. In 1913, we accepted Riggs' allocations of exclusive ore track; in 1912, it rested on my judg-

sequence of exclusive ore track; in 1912, it rested on my judgment, which was arrived at by inquiry of operating officials regarding the character of traffic on the various branches and the fact that I had known a good deal of the character of the traffic on these branches from being in this case. I considered as ore mileage in 1912 the mileage from Eagle Mills to Winthrop Jct., on the south track, traffic spurs of 15.55 miles which I cannot now definitely locate (which compares with 16.05 of Riggs for 1913 in Complt.'s Ex. 1a, Riggs), and joint spurs of 1.59 miles, as compared with Riggs' 1.37 miles—a total mileage, in 1912, of 25.47, while Riggs' total is 26.25. This is main line, branches and traffic spurs. Of the sidings, I included 21.72 miles in 1912, while Complt.'s Ex. 1a shows 31.84.

In arriving at Ratio 4 for 1913, we applied the same percentage for delay by passenger trains to freight trains as was computed by Mr. Thompson for 1912, namely, 2.75%. We deducted the 2.75%

from the time of the freight trains.

Ratio 8. Plaintiff's records in 1913 show the actual interstate and intrastate revenues for Wisconsin, and I availed myself of those figures, which produced the ratio I have for 1913. The 1912 explanation or Ex. 72 shows how it was arrived at for that year.

Ratio 11 is different in 1912 from 1913, in that in 1913 there was no deduction in passenger train mileage made on Mineral Range.

Ratio 13 was determined in the same manner in both 1912 and 1913. On the basis of the total yard and road switching in Michigan being 100%, it subdivides to passenger 3.41% and to freight 96.59%. This was obtained on the basis of time as related to the activities of the various yards in which switching was done.

We observed St. Ignace, Marquette and Houghton yards, took notice of the number of passenger trains for which any switching was done at these points, took observation of what would be a liberal amount of time devoted to that work, aggregated the time, converted it into miles upon the factor of six miles per hour, and determined therefrom the total number of miles which would be made in such operations at each yard.

In arriving at the passenger percentage, we observed the movements of the passenger trains requiring or receiving switching in the various yards, applied to each of those movements an amount of time in our judgment more than proper, reduced the same to miles on the basis of six miles per hour, and then deducted from the total yard switch-

The 1913 percentages for Ratio 13 were based upon the 1912 and 1913 observations, being applied to the train movement of 1913. The percentages for passenger switching, as given by me for 1912 and 1913, of 3.40% and 3.90%, represent, in my judgment, a sufficient amount for passenger service. If there is any error, it is against us,-against the passenger side of the case,-by reason of drawing a greater percentage into passenger switching than actually The freight switching entering into this ratio includes no road switching before one full hour is reached at any single point of

Ratio 13b depends upon actual observations at individual yards. The several ratios, 1 to 17, in Defts.' Exhibits 72, Thompson, and 77, Parker, are, as described therein, true ratios of the things they purport to be.

PARKER recalled. 826

Further direct examination.

By Mr. Wykes:

Q. Will you produce, Mr. Parker, the annual reports of the Association of Railroad Commissioners for the years 1891, 1892 and 1893?

A. I have these reports, 1891, 1892 and 1893.

Q. Taking the report for 1891, will you read the action and discussions of the Association of Railroad Commissioners with reference to the revenue train mileage basis for the apportionment of common expenses between passenger and freight?

Mr. Eldredge: I object to it as irrelevant and immaterial, and also that it pretends to be nothing more than a report of the proceedings of certain railroad commissioners, and that any statement that they might have made is not admissable in evidence and can only be proved by them and an opportunity given for cross-exami-

Mr. Wykes: The theory of using this, your Honor, is that in plaintiff's proof it appeared that the I. C. C. had in force for a long time the method of division of operating expenses on the revenue train mileage basis, but afterwards they abandoned it. Now, the abandonment was brought about through this action of the Association of Railway Commissioners, and I think under the entire proof it is a necessary part of that history, and I assume the Master will let this go in subject to Mr. Eldredge's objection, so you may read, Mr. Parker.

Mr. Eldredge: I wish to make this further objection, having

listened to Mr. Wykes' statement, that, even if it be true, the statements of a commissioner, or the proceedings of the Association, are not admissable in evidence, upon any theory, for the reason that

the views and statements should be proved by the parties, and

they should be subject to cross-examination.

The Master: Do you propose to connect this discussion of the Railroad Commissioners with the action of the I. C. C. in

abandoning the basis that you speak of?

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Mr. Wykes: It has been connected by Prof. Adams and, I think, by Mr. Delf. But these documents have not gone in, and, you remember, Prof. Adams tried to give extracts, and Mr. Butler objected, on the ground that the books themselves were not produced and that Mr. Adams was giving extracts, and I am now producing the whole of the documents, in answer to Mr. Butler's objection, so as to furnish the whole thing. First, Mr. Luther, mark those three books defendants' exhibits; 1891 will be 94 (should be 66). I make the whole report as exhibit, and then, if Mr. Eldredge wants to refer to anything that I don't use, it is in the record, where he can do it. 1892 marked Defts.' Ex. 95 (should be 67), Parker, June 2, 1914; 1893 marked Defts.' Ex. 96 (should be 68), Parker, June 2, 1914.

Q. Now, Mr. Parker, you may proceed to read in evidence the extracts pertaining to the revenue train mileage basis which you find in each of the reports marked exhibits 94 to 96 inclusive, but which should be Defts.' Exhibits 66, 67 and 68.

From the report of the Committee on Uniformity of Railway Accounts, page 96 of the Proceedings of the Third Annual Convention

of Railroad Commissioners, 1891:

"* * The second proposition of the executive committee is to discontinue the division of expenses between passenger and freight and to abandon all efforts to ascertain the cost per passenger per mile of the passenger traffic and the cost per ton per mile

of the freight traffic, because the results obtained are only approximate, unreliable, and misleading. It is admitted and distinctly stated in the instructions accompanying the form of returns that the results obtained by the present method of apportionment are, and in the nature of the case must be, only approximate. It is difficult and perhaps impossible to determine just what proportion of the cost of maintenance of way and structures, which constitutes about twenty per cent of the total operating expenses, is properly chargeable to passenger and freight traffic respectively, and the same is equally true of many of the items under each of the different heads of operating expenses. A very considerable per cent of the total operating expenses can probably be definitely determined as properly chargeable either to passenger or freight traffic.

We think, however, that the present apportionment, on a basis of train mileage, of those expenses which cannot thus be definitely determined, generally gives a close approximation to the actual cost; and, while we would cheerfully recommend the adoption of any method which would give a more accurate result, we are reluctant

to advise the abandonment of all attempts to obtain the best information possible upon the sulject. Furthermore, we believe that withholding from the public all information upon this subject is more likely to result in adverse and unjust legislation than to publish the best results obtainable, as is now done. In other words, legislation founded upon the best approximation to the truth which can be devised is less likely to be harmful to the railroads than that which is founded upon entire ignorance of the subject. Inasmuch, however, as the committee which had in charge the arrangement of the program for this Convention has assigned as a topic for special discussion the 'Apportionment of Expenses to Freight and Pas-

senger Traffic, your committee does not feel like making final recommendation on this subject. This question, there-829 fore, may properly be regarded as in the hands of the Convention

itself.

WM. O. SEYMOUR. ISAAC N. PHILLIPS. ISAAC B. BROWN.

The Chairman: The report will be considered as adopted, if there It is now before the Convention. I would inquire is no objection. if representatives of the American Association of Railway Accounting Officers are present, and whether they would like to be heard at

Mr. Riebenack: If it is in order I would like to make a few rethis time. marks with regard to that feature of the report which relates to the attempted division of expenses between freight and passenger business of railroads. I have given the subject considerable attention, and will only detain you a few moments to present what I think is the experience of all accounting officers.

I do not believe that anything now can be said in regard to the impracticability of arriving at reliable data for determining accurately the division of expenses between passenger and freight

business in operating a railroad.

It has been a favorite idea with all the prominent lines in existence to arrive at some basis for so dividing their expenses, and the endeavor to accomplish this result has fully taxed the ingenuity and abilities of managers. The field has been well plowed and much seed sown, but the harvest has been barren, so far as any

generally satisfactory conclusions are concerned.

In giving you some reasons for the cause of the failures, and in demonstrating the impracticability of attempting it 830 in any manner so as to produce a basis universally applicable, I do not pretend to give any new thoughts, but merely to bring to your attention, in as plain a manner as possible, what has been attempted and what is being done, and to prove that the results reached are purely of local utility.

It is a recognized fact that only about 40 per cent of the expenses of a railroad divide themselves naturally as between the two great sources of revenue—freight and passenger—leaving about 60 per

cent to be disposed of arbitrarily.

Five methods for accomplishing this have come to my knowledge, as follows:

First. Miles run by freight and passenger locomotives respectively. Second. Miles run by freight and passenger trains respectively. Third. Gross freight and passenger earnings respectively.

Fourth. Mileage of freight and passenger cars respectively.

Fifth. Freight tonnage mileage and passengers moved one mile.

With the first two of these I am most familiar, as it has been the basis for the past twenty-five years on which the company with which I am connected has allotted its expenses common to both passenger and freight business and not wholly chargeable to either.

The respective mileage is taken of the freight and passenger locomotives hauling the trains, regardless of whether the cars are few

or many, loaded or empty.

Mileage of locomotives running mixed trains is allotted between freight and passenger mileage on the basis of the mile-

age made by exclusively freight and passenger locomotives.

The road is divided into three grand divisions, and a separate record of freight and passenger locomotive mileage is kept for each grand division. Separate records are also kept for the various sub-

divisions and branches under each grand division.

The percentages vary each year, and instructions are issued annually of the percentages on which the expenses common to both freight and passenger traffic are to be divided, based upon the previous year's mileage. To show you how they vary on the different divisions, take the line from New York to Pittsburgh, which is divided into four divisions, the first division from New York to Philadelphia; such expenses in 1890 were divided ½ and ½ each; from Philadelphia to Harrisburg, 7/10 freight and 3/10 passenger; Harrisburg to Altoona, 8/10 freight and 2/10 passenger, and Altoona to Pittsburgh, 7/10 freight and 3/10 passenger.

On the Philadelphia and Erie railroad the expenses of the entire three divisions are divided 8/10 freight and 2/10 passenger,

it being principally a freight road.

On our Philadelphia, Wilmington and Baltimore railroad from Philadelphia to Baltimore the expenses are divided 4/10 freight and 6/10 passenger.

On the Camden and Atlantic railroad the passenger traffic largely predominates, the expenses being divided 2/10 freight and 8/10

passenger.

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On the West Jersey railroad the expenses are divided 3/10 freight

and 7/10 passenger.

This method is perfectly satisfactory to the officers of my company, and having been kept for so long a period it has added importance yearly as comparative information, measuring the efficiency of officers in operating, and producing economical administration; but it is clearly understood that it is not available in determining any policy affecting the making of rates, for the reason that the basis is abitrary, without solid principles as a foundation, and serves our purposes only as a gauge to keep expenditures within established bounds.

The second basis, miles run by freight and passenger trains respectively, is the one laid down by the Interstate Commerce Commission, with the proviso that for mixed trains the assumed ratio be

3/4 freight and 1/4 passenger.

This basis is arrived at by the assumption that the heavier weight of the freight train is offset by the higher speed of the lighter passenger train. While such a rule might apply to a few roads it cannot be made applicable to all railroads, as there is a wide difference between the relative weight of the freight and passenger trains to each other in different parts of the country.

All attempts made by railroad scientists in endeavoring to establish relative wear and tear of track and roadbed, as between the speed of fast express trains and the heavy weight of freight trains, have been clouded with doubts, and the various conditions of grade and location made any conclusions on one line of no value with another.

The third plan, dividing expenses in proportion to the gross freight and passenger earnings respectively, is no guide whatever, for the reason that in the same year either one of the classes of traffic may be affected by a reduction in rates that would lead to false conclusions, and be no guide for other years.

The fourth plan, division on the basis of mileage of freight and passenger cars respectively, has inequalities, as it assumes that the weight of freight and passenger cars is the same, while the

fact is a passenger car weighs twice as much as a freight car.

The fifth theory, that carrying a passenger one mile is the same as carrying a ton of freight one mile, is merely an assumption, and it is not warranted by anything approaching an equitable demon-

stration.

The cost per ton per mile as now reported is the general average for all classes of freight, obtained by dividing the tons one mile into what has been assumed to be the cost for its movement, while a moment's reflection will convince any one that the expense of handling the various classes must differ as widely as the rates charged. For instance, shipments from New York to Chicago in the six established classes vary from \$15.00 per ton to \$5.00. One line may carry principally high-grade freight, dry goods, boots and shoes, etc., and another lowgrade freight, like lumber and ore. A general average of cost would therefore have no significance in deducting any conclusions—in fact, could only be misleading in most cases.

The cost per passenger per mile is still further from a fair basis. The passengers one mile are divided into the assumed passenger expenses, without any reference to the fact that the expenses for moving express, mails, and miscellaneous shipments, such as milk, mar-

keting, etc., by passenger trains are included therein.

A low estimate places the cost of movement of mails and express business at about 70 per cent of the receipts, to which should be added all incidental expenses connected with conducting the business

of these two important sources of revenue.

834 Another disturbing element which would seriously affectresults of cost of movement is the financial condition of a
railroad. A prosperous company may decide to charge to its operat-

ing expenses work done on account of betterments, such as substituting stone bridges for iron or wooden ones, rebuilding equipment of engines and cars on more costly plans, replacing old stations with more expensive structures, which would greatly increase the cost of moving a ton of freight or a passenger per mile. Another company of equal financial strength may not include such items in operating expenses, but carry such expenditures direct to 'income account' as 'extraordinary expenses,' while a third, whose reserve finances are not strong enough, would charge them to capital account.

It will be seen, therefore, that the attempts to show the average cost per mile of carrying a ton of freight or a passenger per mile leads us so deep into the field of conjecture as to make the thoughtful When you consider that 60 per cent of the expenses of railroads cannot be divided at all, as between freight and passenger, the results obtained by the following of any arbitrary rule for making such division of expenses cannot be sufficiently definite for practical purposes, and if used as facts for basing legislative action upon them must be unjust and injurious both to the public at large and investors in railroad property. The object of all statistics is to obtain useful information as a guide to beneficial results, and no plan adopted should have any organic faults which may lead to misinformation and erroneous deductions.

Finally, is it so very desirable to have this information for arriving at general conclusions on which to base legal action? the general result of the percentage of operation safer and a more re-

liable standard, for practical purposes, to judge by?

The statistics produced by the Interstate Commerce Com-835 mission from the reports of railroads are in most cases so thorough and complete, and their arrangement exhibits such great ability and a broad comprehension of what is desirable to be arrived at, that they may well serve as a model for the states to follow, but it is respectfully and impressively suggested that its valuable results should not be marred by any information that is based on assumption or theory and not demonstrable by clear and indisputable facts.

(Page 112:)

The Chairman: The motion is that this whole subject is left in the hands of the committee that has it in charge, with instructions to report to the next Convention, and that in the meantime the members confer with the Association of Railway Accounting Officers.

Mr. Riebenack: That carries with it a postponement?

The Chairman: Yes sir. The motion was agreed to."

From the Report of the Committee of Uniformity of Railway Accounts, Proceedings of the Fourth Annual Convention of Railroad Commissioners, 1892:

(Page 17:)

The two questions which most vitally affect the present form are:

1st. Shall taxes be considered as a fixed charge or as an operating

expense? and

2nd. Shall the assignment of expenses to freight and passenger traffic be continued?

(Page 21:)

We are now prepared to consider the second proposition, viz., whether the assignment to freight and passenger traffic should be continued. It is well known that a large proportion of expenses of operation is common to both the passenger 836 and the freight service, but not wholly chargeable to either. Salaries of general officers, station agents, and telegraph operators, expenses of the maintenance of way and structures, and other like expenses, will serve as examples of those outlays which do not naturally divide between the passenger and the freight service. expenses there are that classify themselves. What per cent of the entire expense of operation is incapable of being accurately classified is variously stated, the lowest estimate being forty per cent, while some allege the amount to be as high as sixty per cent of the entire This large proportion, expended for the common benefit

rule now used is stated upon page 42, of the Form of Annual Report in these words: 'All expenses which are naturally chargeable to either passenger or freight traffic should be entered in their respective columns. Expenses which are not naturally chargeable to either traffic should be apportioned on a mileage, making the division as between passenger and freight traffic in the proportion which the passenger and freight train mileage bears to the total mileage of trains earning

of both branches of the service must, therefore, if apportioned at all, be divided in accordance with some arbitrary general rule. The

revenue.

'Mixed trains will continue to be treated for the present as one-

fourth passenger and three-fourths freight.

We may observe, first, that the rule referring to mixed trains appears, so far as we can learn, to rest upon nothing more definite or valuable than someone's conjecture, and the identity of the conjecturer seems to be unknown. That it is based upon any experience or upon any theory that finds a basis in the facts of the railway business of the country has never been made apparent. This arbitrary rule, that one-fourth of the expenses of all mixed trains must

be charged to passenger service and three-fourths to the 837 freight service, is applied alike to those roads which do a larger passenger traffic and upon which mixed trains are the rare exception, and likewise upon frontier roads where both passenger and passenger traffic is conducted exclusively by mixed trains. There are several roads of the latter class in the State of Illinois, and in the West it may be said generally that freight trains carry a few passengers in the 'caboose.' Whether every train which carries passengers at all would be classed as 'mixed' we do not know, but, certainly, if such trains are so classed, egregiously wrong results would be obtained under this rule, for on the roads of the West many trains carrying a heavy tonnage of freight frequently carry only a very few passengers, whose transportation forms but a mere incident of the entire service of the train.

Without going into a detailed argument, it will appear that the basis so furnished for the division of expenses of mixed trains must be of little value, and, while the volume of 'mixed' service is, perhaps, on the whole not large, it seems to us that either a rule which will produce results substantially correct and true should be found or else the effort to classify the common expenses of mixed trains should

not be attempted.

The most obvious test of the rules given for both mixed and distinct trains would be the results of experience in using them. The test of actual practice fails to satisfy us that these rules are of any utility either to the companies, the States, or the nation. Indeed, if not substantially correct, they could not be expected to be useful and may prove positively vicious. We know that results have been reached by the application of these rules for division which are grossly erroneous, not to say preposterous. To illustrate, we

938 quote from certain letters of Stuyvesant-Fish, president of the Illinois Central Railroad Company. The first concerns the report of that company for the year 1890. Mr. Fish, writing to

Chairman Cooley, said:

The arbitrary rule laid down by the Commission for the distribution of expenses between the passenger and freight service make- it to appear that the Illinois Central earned 372/1000 of a cent per ton of freight per mile and only 34/1000 of a cent per passenger per mile. The case of the Dubuque & Sioux City railroad is even worse, it being made to appear to earn 338/1000 of a cent per ton of freight per mile, while its average receipts per passenger per mile are made to appear to be 273/1000 of a cent less than the estimated cost of carrying each passenger one mile. Obviously, the rule of the Commission charges too much of the expenses to the passenger and too little to the freight service.

'Being unable to suggest a safe rule for dividing the expenses, we do not presume to criticise the one adopted by the Commission further than to point out wherein it fails of application to the business of the Illinois Central Railroad Company, and to submit that it is not right to draw conclusions from, or wise to predicate action upon, figures so obviously erroneous.'

And, again commenting upon the Report for 1891, Mr. Fish says: "The arbitrary rule laid down by the Commission for the distribution of expenses between the passenger and freight service make- it appear that the Illinois Central earned during the past year 332/1000 of a cent per ton of freight per mile, and that it lost 77/1000 of a cent per passenger per mile, and that its entire passen-

ger business was done at a loss of \$141,715.37.

Roads could perhaps be found, reporting to the Interstate Commission, whose business is so divided between the passenger and freight service and is performed under such conditions as to render the rule now in use as near right as any general rule that could be devised. Evidently, that rule, as Mr. Fish says, fails of proper application to the business of the Illinois Central Railroad Company; and probably other roads may be found from whose reports.

and probably other roles may be found instead of too much following this rule, it would appear that instead of too much expense being charged to passenger service and too little to freight, as in the case of the Illinois Central Company, it would be found that too much is charged to freight and to little to passenger. We have no such case at present in mind; but the varying conditions under which the railroads of the country do business, and the wide difference in the character of their respective traffics, renders it highly probable that such cases exist and might be found if searched for.

In answer to one of the above letters of Mr. Fish, judge Cooley,

among other things, wrote:

'I understand very well that it is absolutely impossible to so apportion the cost of freight and passenger service as to reach accurate results. Nevertheless, if it is desirable to obtain the statistics of the roads at all, they ought to be obtained on the same basis. They would not otherwise be of much value. Our blank reports, therefore, are the same for all the roads.

'I may perhaps with propriety add that I can very well see that the application of the rule does not lead to correct information regarding the cost of passenger traffic considered by itself, and if the matter were exclusively in my hands I should probably make considerable change. It is too important a matter, however, to act hastily upon, and I think any action should be taken with the full accord of the Association of Railway Accounting Officers.'

Referring to the statement quoted above from Judge Cooley that 'any action should be taken with the full accord of the Association of Railway Accounting Officers,' it may be noted that the opinions of the railway accounting officers, in the association and out, which have, through the kindness of the statistician, been collected for the use of our committee, are practically unanimous in favor of discontinuing the attempt to apportion expenses between passenger and freight traffics. Thus we have the 'full accord of the associ-

freight traffics. Thus we have the full accord of the association' which his honor Judge Cooley thought desirable; and while we are aware that railway officials do not always view questions of this kind from the standpoint of the public interests, as it is the duty of railway commissioners to view them, still as regards this matter we are convinced, after full reflection, that the public interest is not antagonistic to that of the companies themselves, and that all the recommendations are made in the utmost good faith.

And this brings us to a consideration of the purpose of requiring this division, which it is admitted must be made, if at all, upon an arbitrary basis. It has been said (and we will meet the case squarely) that the fixing of tariff rates for the transportation of passengers and freights, under governmental authority, is likely to become one of the leading functions of the railway commissions of the country, and that it is therefore desirable that statistics be collected from which can be derived the information called for on page 61 of the commissioner's form to be used as a basis for the fixing of maximum freight and passenger rates. It is said such items as 'estimated cost of carrying each passenger one mile,' 'passenger earnings per mile of road,' 'passenger earnings per train-mile,' 'estimated cost of earrying one ton one mile,' 'freight earnings per mile of road,' and 'freight earnings per train-mile,' are necessary as a basis for the fixing of rates, and should be preserved even though perfectly correct results are not obtained.

Every one will admit that if the items of cost of freight and passenger service above quoted from the form on page 61 could be obtained with substantial correctness the information would be valuable, and it would certainly be quite as valuable for the roads as it would be

for the railway commissions or other governmental agencies.

But we have not yet arrived at the point of being able to see how a body of inaccurate statistics, which are supposed to

support another body of erroneous deductions, can be of practical value to any legislative or executive branch of government, any more than they would be valuable to the companies themselves. It is said a uniform basis must be adopted and maintained to secure the benefit of comparisons; but it is difficult to understand how, if one error is vicious and harmful, an accumulation of errors may become salutary; and it is quite as difficult to see how true statistical instruction may be derived by comparing a large number of errors more or less gross with each other.

We have little share, anyway, in the expectation that just railway rates will ever be established through statistical tables showing 'per mile,' 'per ton,' or 'per passenger' costs. We do not believe that information of this kind ever did furnish the basis for actually fixing tariff rates, or that it ever will, because we believe that, even where railway commissions are clothed with power to fix rates, such rates will be made up upon a different basis and depend upon different conditions from any disclosed by such statistics. Particularly must this be true so long as the cost items per unit of traffic are confessedly

erroneous and do not represent the true facts of the case.

So far, therefore, from the statistics obtained from this division being valuable as affording a criterion for railway rates, we believe that the very fact that this false information is liable to be so used is the more cogent reason which could be given for ceasing to furnish a basis confessedly erroneous. A man who travels in the wrong direction is certainly as likely never to arrive at his destination as one who travels not at all.

By all this we do not mean to be understood as saying that unless absolutely correct and accurate information is obtained the attempt to classify expenses should be abandoned. We do, how-

ever, mean to say that unless a result which is substantially and approximately correct can be had, it is better to leave the subject untouched, and to permit (if a cost criterion must be had) the statistics of each road to be estimated separately and in the light of its own conditions of traffic, and to be so estimated by those who may have the rate-making power.

In the somewhat lengthy investigation we have made in this matter one fact has arisen to a position of absolute clearness in our mind, which is that no universal or uniform basis of such division of expenses will ever yield statistical results near enough correct to be of

practical use, or, indeed, not to be positively harmful.

When we consider that the proposed division of expenses must be made on, say, some coal road of Southern Illinois which hauls an occasional passenger, by the same rule and upon the same basis which is applied to a passenger road connecting New York and Philadelphia or Philadelphia and Washington, what possible value can be expected in results so obtained?

If it were possible in the case of any single road to arrive at a correct rule for apportionment of operating expenses, it would remain doubtful whether the rule thus found would be applicable to any other road doing business in the country, and certainly it could never

be applied to any considerable number of other roads.

Your committee also approve and would recommend the transfer of the items mentioned in the 'Suggestions' from 'General Expenses' to definite accounts, under the head of 'Conducting Transportation,'

thus necessitating the introduction of some new accounts under that heading, such as 'Superintendence,' 'Hire of Equipment,' 'Clearing Wrecks,' 'Oil, Tallow and Waste,' 'Outside Agencies and Advertising,' 'Commissions,' 'Stationery and Print-

ing,' etc.

It is impossible to enumerate in detail all the minute changes suggested and to give the reasons therefor in this report without extending it beyond reasonable limits, but your committee recommend the adoption of the changes in the 'Classification of Operating Expenses' suggested by the executive committee of the Association of American Railway Accounting Officers, as shown in a copy of said suggestions filed with this report. If this Convention should see fit to adopt, in whole or in part, the recommendations of the committee, it is suggested that the changes shall not take effect until for the year ending June 30, 1893.

We desire to express our gratitude to the executive committee of the American Railway Accounting Association and to the statistician of the Interstate Commerce Commission for their valuable assistance

in the discharge of our duties.

With the submission of this report your committee respectfully ask to be discharged.

WM. O. SEYMOUR, ISAAC N. PHILLIPS. ISAAC B. BROWN. The Chairman: The Convention has heard the report of the Committee on Uniformity of Railway Accounts. What disposition is the pleasure of the Convention?

Mr. Becker: I move that the report be accepted and the committee discharged, and also that the report be laid on the table for

844 future consideration.

The motion was agreed to.

(Page 70:)

The Chairman: * * * The regular order for half past three is the report of the Committee on Uniformity of Railway Accounts, and its consideration is now in order.

The report seems to be in two parts—one in regard to taxation, and the other relates to distribution of accounts. They may be considered as a whole or separately, as the Convention may order."

From the Report of the Committee on Uniformity of Railway Accounts:

Mr. Hill of Virginia: "I desire to ask Mr. Seymour a question. I listened as carefully as I could to the reading of the report, but do I understand that the Committee reports in favor of abandoning the division of expenses as between freight and passenger traffic, and of hereafter including both under the head of operating expenses.

Mr. Seymour: The committee reported in favor of abandoning

Mr. Seymour: The committee reported in favor of abandoning the apportionment of expenses between freight and passenger traffic.

Mr. Fleming: Mr. Chairman, if I may be permitted, I would like to make a suggestion. It is almost impossible for us to pass upon all these reports without some definite proposition be laid before the Convention. I don't remember that the committee proposed any special resolution summing up the practical points, and therefore I suggest that it would facilitate business if they would put in short

form just what practical points they desire to have acted upon.

The Chairman: If the Chair may be permitted to suggest, it seems to me that the question should be, first, on the adoption of the report in regard to taxation, and then on the other part, so that action may be taken separately.

* * *.

(Page 97:)

The Chairman: * * * The next recommendation of the committee is, as I understand it, one upon which the committee and the account-officers are unanimous.

Mr. Seymour: The question is upon the recommendation to discontinue apportioning the expenses between freight and passenger earnings. Upon that question the accounting officers and the committee are unanimous.

Mr. Adams, the Statistician: This proposal of the committee seems to me to be by far the most important one that comes up in this report, and I rise simply to suggest that, as it involves a very important question, I doubt whether it ought to be forced through. Before the

vote is taken I would like to be allowed about two minutes. All that I wish to say is this: It is doubtless true that the opinion of the railway accounting officers throughout the country supports the proposal of the committee. It is also true that the rule of apportionment of expenses as between passenger and freight earnings as laid down at the present time does not reach the best results.

My thought is, that inasmuch as the proposal of the committee involves the abandonment of all attempt to arrive at the cost per ton per mile and the cost per passenger per mile, the vote upon that pro-

posal ought not to be taken without discussion. statistics is to assist commissioners in the performance of their If the statistician knows what the theory of rates is which the commissions to whom is entrusted the question of determining just and reasonable rates have accepted, he can adjust his work to that rule. There is at present no clearcut and universally accepted theory for determining what is a fair and reasonable rate, but if there be any shadow of such a theory, it is that rates are in some way attached to cost. This being true, I would ask if it is wise to abandon without discussion all attempt to get at the cost per ton per mile. I admit that the present rule for arriving at this result is an imperfect one, but it is possible that better rules may be formu-It seems to me that in this matter the Convention should defer to the wishes of the commissioners, to whom is assigned the duty of determining what is a just and a reasonable rate. If the commissioners of such States say that the assignment of expenses to passenger and to freight is of no importance, I should heartily favor the recommendation of the Committee. It is because I feared that this most important question, so far as accounting is concerned, was to pass without discussion that I ventured to make these remarks.

Mr. Dey: I belong to a commission whose duty it has been to fix rates for the transportation of freight. It has been a very serious and difficult matter, and it seems to be the aim and wish of these corporations to give us just as little light as possible on the means by which we may arrive at a solution of questions presented. It strikes me that this matter should not be disposed of without a little more

thought and a little discussion than it has had.

Mr. Wilson: This is a very important matter and I move that we adjourn until tomorrow at ten o'clock.

The motion was agreed to, and the Convention at 5:25 p. m. adjourned accordingly.

The Chairman: The Convention will come to order. Yesterday afternoon the Convention adjourned pending the discussion as to the division of expenses between passenger and freight traffic. Is it the pleasure of the Convention to proceed with that discussion, or to take up the report of the Committee next in order of business?

Mr. Adams: I am responsible I believe for having this question postponed until this morning.

The matter is one of very great importance, and I think that

of all the questions which are presented this session to the Convention, upon which a definite vote is expected, this is probably the most important. It would not be wise to enter into any extended discussion with regard to the ability of railway accountants to separate the expenses between passenger and freight, for I think it is conceded by all who have looked into this matter with care that that division cannot be made with absolute accuracy.

Looking at the matter, then from the point of view of an accountant or statistician, I will frankly say that if the matter is to come to a vote at the present time, I prefer that the recommendation of the

committee should be accepted, and that the assignment now attempted between passenger and freight expenses should be abandoned. But, as I remarked last evening, the question is not entirely a question of accounts. The purpose for which this assignment between passenger and freight expenses has been maintained is to arrive at the average cost of moving a ton of average freight, and it is generally believed that this information is of assistance in determining what are fair and reasonable rates. The question, so far from being a question of accounts, is one which should be determined by those who are imposed by law with the duty of making rates.

The question presented to this Convention, therefore, reduces itself to this: Do the commissioners upon whom is imposed the duty of determining in particular cases whether a schedule of rates is just or unjust, of the estimated cost of moving a ton of freight one mile? This assignment of expenses to passenger and to freight traffic is something that has been going on for over thirty years, and I do not think its abandonment ought to be effected unless the matter is clearly understood. If it is abandoned it should be only after the most careful consideration. We have now before us the facts in the case so far as the representatives of the railways are able to present We have their side of the question clearly presented, and in the investigation undertaken by the statistical department of the Interstate Commerce Commission the opinions of the prominent railway auditors in this country have been gathered together. We have not, however, the views of the State railway commissioners, who are most interested in the question.

It occurred to me, therefore, Mr. Chairman, that possibly before a final vote came upon this very important question we should ask the commissioners of those States upon whom is imposed the duty of determining what is a reasonable and a just rate whether they

actually make use of this average; whether they regard this approximate information as useful? And if I were a member of this Body I should make a motion to the effect that this second recommendation of the committee be laid upon the table for a year—that is, until our next convention. In the meantime that there be appointed another committee, who shall correspond with the commissioners of the States referred to, and gather facts pertaining to the use that has been made in the past of this average cost per ton per mile and the opinions of these commissioners with regard to the desirability of continuing the apportionments.

Mr. Fort: I have listened with much interest to the remarks of the gentleman who has just taken his seat, and I hope this convention will not adopt the second recommendation of the committee. senting a commission that is required to make rates, I beg leave to state that use is made by that commission of the items now sought to be combined. They are not regarded as strictly accurate, but as They are considered as a circumstance in rateapproximately so. making, and a very important one, and if we are to abandon that system because we cannot get mathematically correct information we will be absolutely in the dark on this subject. It seems to me it would be much better to have some information that is approximately correct than to have no information at all. The question of fixing just and reasonable rates covers a wide field, and a great many elements, of course, enter into the question for its proper determina-This is one circumstance which always, by the Georgia commission at least, is considered important. It frequently arises upon the questions of change of rates, on the question of fixing a standard or schedule, and it seems to me, as Judge Cooley says, the

850 railroad problem is the rate question. While only seventeen State commissions have authority to make rates the others, I

dare say, will finally be given that power.

So I trust this Convention will not adopt the suggestions of the committee. While they have been very strongly presented, the substance of the argument, as I have gathered from the able report, is because we cannot get mathematically accurate information, we had better have no information. I do not think that is good reasoning, and, speaking for one of the commissions that has the rate-making power, I beg to enter my protest against the abandonment of this source of information that is much used and of much importance.

Mr. Wheeler: I in part represent a State whose commission has the rate-making power, and we disregard in making our rates the approximate passenger and freight expenses. We pay no attention to them, but we classify our roads according to the net earnings per mile. That includes both passenger and freight, and we base the rates upon

those net earnings.

And I will say further that I do not believe there is a State in the Union where there is less friction between the people and the railroads than in the State of Illinois. They are satisfied on both sides. The people seem to be satisfied with the rates, the roads seem to be satisfied with the rates; at least they accept the rates—the maximum rates—as published by the commission, and in many instances make rates lower than those authorized by the commission. We do not prescribe minimum rates. We simply fix maximum rates, and the people are satisfied with the actions of the various roads in following the rates as established by the commission or in making lower rates

than the commission authorizes. I repeat that I do not believe there is a State in the Union where there is less friction between the people and the railroads than in the State of Illi-

nois.

Mr. Putney: Mr. Chairman, I am somewhat out of the pale of this discussion for the reason that in preparing a form for our railroads

to make their returns upon, and trying to conform as far as practicable to that of the Interstate Commerce Commission, we have cut out the apportionment of expenses entirely, and I cannot conceive of any circumstance that would induce us to put it back. But perhaps I may say a word about the reason. In the first place, I believe this division is largely arbitrary and therefore incorrect and misleading; it is of no use unless it is accurate, and that cannot be, in the nature of things. But it is suggested that if we cannot get just what we want, let us approximate to it. Now, we have the duty of regulating rates in our State—fixing the maximum charges and regulating them generally upon complaint. I have never been able to see how this division of expenses in the freight and passenger business helped us in the least; how it could help us if it was perfectly exact. It don't amount to anything to us when trying to fix a fair coal rate from the seaboard to our interior towns to know that the average cost for hauling all freight, including coal, baby carriages, benzine, silk, and everything else, is a cent per ton per mile. It won't help us, to give the people a fair rate through the gorges and over the heavy grades in the White mountains or to give it down in the suburbs, to know that the average rate and cost of hauling passengers is so much when we include the suburban passengers, where passenger trains are heavily loaded and the roads are easily and cheaply constructed, and also the mountain business, where passengers are few and the

852 cost of construction very great. And so I cannot see how it could help us in Georgia or New Hampshire, to fix a rate on a specific article for a specific distance, to know what, if we could know, the average expense of doing all of the business of the roads is. I think the items entirely misleading. They are made up necessarily by railroad accountants in an arbitrary guess-work manner. I never was able to see any earthly use for it, and it seems to me that that is one thing to avoid in these returns; it is calling for the impos-

sible, or the absurd, or the useless.

They used to talk down in our country about a very eminent and radical Prohibitionist, of whom they said he would be a very useful citizen if he could let rum alone under every circumstance. There are lots of that kind of men; they cannot avoid doing too much; but it is what we ought to avoid when we call upon a railroad to furnish information which cannot be given, which is of no use if it could be given; it simply cheapens the whole system of railroad reports, it

seems to me.

Mr. Fort (of Georgia): Would you say that a maximum rate fixed below the cost of service, economically performed, would be a just

and reasonable rate?

Mr. Putney: I don't see that it affects it in the least. We are called upon to fix a rate on coal from the seaboard to a place forty miles in the interior. Now, if somebody will explain to me how the reports, as they have been called for heretofore, aid us in the least, I would like to know, if we could know, what it costs to haul that ton of coal. But you lump everything in a grand mess, and it has no relation to anything you want to know.

Mr. Beckman: Mr. Chairman, I would state that we are a good deal in the same fix in our State. We have some thirty roads. For some of the roads we establish a rate for passengers of 2½ cents per mile, and for others a rate of 10 cents per mile. If we did not allow 10 cents per mile the claim would be made that the passenger business was too light for a lower rating. We make a rate for almost every road. Where there is a great deal of travel we make a less rate; but where the travel is light and amounts to only a trifle we make a high rate. On one road they keep up forty miles of snow-shed, and we have to take all such things into consideration; therefore the statistics would be of very little use to us:

Mr. Fort: I move that it lay, this portion of the report, on the table, to be taken up at our next annual meeting. Perhaps we can arrive at that time ar some more accurate form than the one now adopted for ascertaining these facts.

The Chairman: It is moved and seconded to lay on the table that portion of the committee's report relating to the apportionment of

Mr. Woodruff: May I ask further if it is designed to lay on the

table the matter for another year or is there-

The Chairman: The motion, as I understand it, was to lay that portion of the committee's report on the table until another year.

Mr. Wheeler: It seems to me, even from the remarks of those gentlemen who are not prepared to adopt the recommendation, that there will be no future light upon the matter. If this is admitted, that it is impossible to give anything but an approximate estimate, and, as has been stated here, that it is all guesswork, there is no use of postponing action on this question. That is the way it seems to me.

The Chairman: I think perhaps the gentleman had better withdraw his motion, as the discussion does not appear to have been concluded. If there is no objection we will continue the discussion.

Mr. Dey (of Iowa): * * * Now, I don't know that the form of question presented is exactly the correct thing, but I would like to see this question postponed for a year. That time will give the railroad journals, the business men interested, the railroad officials and everybody else a chance to give it full and fair discussion, and if they can satisfy us that these statistics are worthless to the commission or the world in reaching correct data, then we are willing to take this step and consider them worthless. I for one would be very desirous of voting with them. Certain information which has been asked and which we deem necessary has been refused, and we have

had to let it pass along without having any sort of chance to learn anything; besides, they attack us in the papers and in the railroad journals and everywhere else. The returns when made are of no value to us and don't pay. I feel very anxious about this matter, because the disposition of all these long roads—not the short

roads like some of those in New England, but these great roads that pass from State to State, whose officers say to us, 'Here are our gross earnings, here our gross expenses, and that is all we can give you in the matter of statistics.' That disposition seems to be growing. I do not mean to charge bad faith against anyone, but the lines have been gradually narrowed down, until now the reports of some of these roads, to say the least, are not particularly valuable.

Mr. Wilson: I represent the State of North Carolina, which has the power of making rates, and they have been uniformly adopted by our roads; we also have uniformity in railroad accounting. This gives us the information desired, which is furnished to us upon the printed form of the Interstate Commerce Commission, and I, for one, would be very loath to make any change in regard to the accounting methods pursued in our State. I have heard nothing from that Commission upon the proposed change in this report, and I would like to have the matter postponed for a period of twelve months. During that time we can hear from the parties interested, the railroad journals of the country, the newspapers, and all publications interested in the work, and be in better condition to determine upon that matter at that time.

The Chairman: The question comes up on Judge Fort's motion to lay that portion of the committee's report relating to the apportionment of expenses to passenger and freight traffic on the table for one year—to be considered another year. Shall I take the vote by

yeas and nays?

856 Mr. Woodruff: I assume that this vote is to prevail. I would like, however, to have the gentlemen amend it in such form that it be referred to a committee, to be reported at the next meeting. I may assume to say that my associate's modesty is equal to his wisdom, and I say this in his behalf: The committee having this matter in charge have served, some of them, for a year or so, and I would like to suggest that a new committee be appointed to take charge of the subject and to consider the matters contained in this discussion under the varying circumstances of other States. I think this would be desirable, instead of its going back to the same committee.

Mr. Freeman: Let us decide this matter one way or another, and if we make a mistake it can be corrected. When we go out from here and are asked what we have done we do not want to say that we have done nothing. Here we have had a committee that has been at work upon this question for three years, that has always been open and ready to receive communications from both sides, and

given it a very full and exhaustive consideration, and made a unanimous report; it does not seem to be a wise thing to postpone it for another year and have another committee begin and go over it again. * * * It seems to me that, inasmuch as the railroads themselves admit that they cannot properly divide these expenses, it is an unfair thing to use those figures either for or against the railroad company. I trust we will decide this matter today.

Mr. Seymour: Before that vote is taken I would like to make a brief statement in regard to the position of the committee. One member of the committee has been serving in this capacity for three years, considering this question; two members of the com-

mittee have served for two years. Last year we made just such a report as is contemplated by this motion—a report 857 postponing definite action upon the subject until we could see a little more of the working of the system. We felt that it was due to the Convention which appointed us this year that we should report our conclusions upon this subject after so long and patient an I am here to urge the Convention to adopt our con-If the facts presented in that report were in any way questioned or assailed the members of the committee would be heard from in defense of it, because we think we have the facts before us to substantiate our position. We have the unamimous opinion of the accounting officers that it is impossible to ascertain—even to approximate—the cost of freight and passenger traffic respectively. We have the opinion, if I may state it, of the statistician of the Interstate Commerce Commission to the same effect. We have the opinion of the chairman of the commission—the late chairman of the commission—positively to the same effect. All of the communications which came to use were to that effect; that instead of being approximately correct in many instances the rule working on certain roads would show that certain kinds of traffic was done at a loss when it was absolutely known that there was a profit. The committee could not see how such a rule was of any use to the Convention, and therefore recommended its abandonment. We are out, as I said before, desirous of prolonging this discussion. The committee does not wish to urge upon the Convention the adoption of its views, but we thought it just to ourselves that we should report our conclusions and leave you to act upon the subject.

The Chairman: The motion is to lay on the table that portion of the committee's report relating to apportionment of expenses between passenger and freight traffic.

The yeas and nays were called for and the Secretary called the roll. The result was announced—yeas, 18; nays, 18. So the motion, the chairman having voted, was lost.

Mr. Walsh: Mr. Chairman, I move the adoption of the report.
Mr. Fort: I move as a substitute to recommit, with instructions to the committee to report at the next Convention.

I ask a vote on the motion that the report be recommitted to a committee of seven, to be appointed by the Chairman, to report to the next annual Convention.

The yeas and nays were ordered and the Secretary called the roll. The result was announced—ayes, 21; noes, 14. So the motion was

agreed to."

From the Report of the Committee on Uniformity of Railway Accounts, Proceedings of Fifth Annual Convention of Railroad Commissioners, 1893:

(Page 41:)

"Your committee, to whom was referred that part of the report of the Convention on Uniformity of Railway Accounts to the Convention of 1892, recommending that the assignment of expenses to freight and passenger traffic be discontinued, and also the transfer of certain items, etc., beg leave to report as follows:

First. We recommend the adoption of that part of the report of the committee made to the Convention of 1892, providing for the discontinuance of the assignment of expenses to freight and passenger traffic. This to take effect July 1, 1893.

With the submission of this report your committee respectfully asks to be discharged.

A. K. TEISBERG, Minnesota;
J. H. PADDOCK, Illinois;
THOMAS THOMPSON, Wisconsin;
WILLIAM BECKMAN, of California,
Committee on Uniformity of Railway Accounts.

(Mr. Beckman filed a letter agreeing to first part of report only.)

The Chairman: Gentlemen; you have heard the report; it is open for discussion and consideration.

Mr. Brown, of Pennsylvania: I move that the report be adopted.

Mr. Clifford: I will state to the Convention that some of us were absent at the time the motion was made by Mr. Brown that this report be adopted. I suppose the effect of the adoption of this report will be to change our present form to correspond to the suggestions of this report.

Mr. Riebenack: The changes which will result from the adoption of this report will introduce some new accounts in the classification of expenses. The subject has been gone over very carefully by the committee. The members of the Association of Railway Accounting Officers, as well as the accounting officers of

railroads not presented in the Association, received copies of the proposed changes and were invited to make recommendations and suggestions. The committee were thoroughly convinced of the reasonableness and propriety of introducing the changes that were sug-The Association of Accounting Officers had the matter before them, in a report of their executive committee, in which they advised the Association fully on the suggestions they had made to the Committee of the Railroad Commissioners, and their recommendations were unanimously approved by the Association. general opinion was that the classification, with the changes, would harmonize better with present accounting methods than the old one,

In answer to Mr. Hillyer's question, I would say that the adoption of this report will involve some changes, and it was so understood by the committee making the report, and by the Association of

American Railway Accounting Officers.

The Chairman: Gentlemen, is there anything further that you have in mind in relation to this question; if so, we would be glad

to hear it.

Mr. Brown, of Pennsylvania: I would state that this is the second time that committees have been appointed on this subject. You remember they reported two years ago, and those who have the Proceedings of the Convention held then will find the arguments that were made in favor of the adoption of this report. The Convention, however, at that time, did not seem ready to act upon it, and referred the matter to another committee appointed by

the Convention held one year ago, and that Committee have 861 again reported in favor of making the changes suggested. The Chairman: Anything further, gentlemen? If not, the ques-

tion is upon the adoption of the Committee's report.

The report was unanimously adopted."

From the Report of the Standing Committee on Corporate Fiscal and General Accounts, Twenty-eighth Report of the Association of American Railway Accounting Officers, 1913:

(Page 22:)

"The report of the Standing Committee on Corporate Fiscal and General Accounts was received, considered section by section, the following action taken thereon, and adopted as a whole.

Section First.

Relative to Statistics—General. Received.

Relative to Statistics—Division of operating expenses between passenger service and freight service. The following resolutions of the Committee were approved.

Resolved, That this Committee concurs in the view expressed by the Special Committee on Corporate Fiscal and General Accounts in the year 1906, and that this Committee, after due and deliberate consideration, reiterates that no fixed rule for the division of common expenses between freight and passenger can be devised which will be equitable to all carriers, to the same carrier under all conditions or

to all divisions of the same carrier; and be it further

Resolved, That the attention of the Commission be called to the fact that even the partial separation suggested by the Commission of stating the amount of expense directly assignable to freight or passenger will involve some additional expense to the carriers, with no appreciable benefit to the Commission.

Since that time the sub-committee, as well as the full Committee, has diligently pursued the matter in co-operation with representatives of the Commission. The subjects thus far presented to your Committee in respect to the general question are:

(1) The determination of those operating expenses which may be directly allocated to:

(a) Freight Service.(b) Passenger Service.

(c) Service common to both freight and passenger service; or, in other words, those expenses which cannot be accurately assigned to either Freight or Passenger Service.

(d) Consideration of fixed formulæ or rules for allocating common expenses to Freight Service and to

Passenger Service.

(2) Traffic Statistics.

(3) Modification of the form of annual report to the Interstate Commerce Commission, which carries with it consideration of the various statistical tables therein required.

Your Committee submits the following report upon each of these subjects:

Subject: Statistics—Division of Operating Expenses between Passenger Service and Freight Service.

In reference to the question of the allocation of operating expenses to passenger service and to freight service, your Committee presents the following:

Whereas, Commissioner B. H. Meyer, in his letter to the Presidents of sundry railroads, in referring to division of operating expenses between passenger and freight used the following language:

"I am advised that the question of separating expenses among the different branches of the business has been raised. This idea is as old as the railroads. I believe such a separation should be undertaken as far as it can be correctly done without unnecessarily suggesting misleading conclusions. I have long felt that every useful scheme of operating statistics rests upon such a separation. I regard this separation as fundamental, and unless hitherto un-

thought of objections can be raised, I assume that all the carriers will cooperate in doing it in the future, as some of them have done it for many years past. A beginning could be made by reporting all expenses which are assignable to passenger, freight and

other branches of the business under existing classifications. 863 All those expenses which cannot be directly assigned, should be reported unassigned, unless the carriers voluntarily desire to submit a complete apportionment. Such apportionments have been made very elaborately for important systems and the Commission would certainly wish to get the benefit of this work; but I should be opposed, for the present at least, to any plan looking toward the assignment or apportionment of all expenses of every class to the respective branches of the business in reports to be made to the Com-If the Commission is in possession of the figures representing expenses which are actually assignable, it can, if necessary, go beyond this, stating for the information of all concerned, the bases more or less arbitrarily adopted for common items, and the reason for their adoption in every individual case. I should be inclined to recommend the adoption of a report from which will leave it optional with the different carriers to report separately only the assignable expenses, leaving common expenses unapportioned, or to report a complete apportionment. In case the latter alternative is selected, however, each carrier should be required to state the basis upon which it made its apportionments and the

reason for adopting that particular basis."

And Whereas, In his remarks before a Subcommittee of this Committee at Washington, D. C., February 8, 1912, he reiterated

that opinion, using the following language:

"One of my suggestions was that, putting aside all controversy with respect to the separation of expenses between the different branches of the business, carriers might report all expenses assignable to passenger, freight and other branches of service under existing classifications. As I see it from the point of view of the Com-

mission. I feel that this is fundamental. * * *.

It is axiomatic with you that before we can have anything in the way of cost, we must have a separation of expenses. course, you come into the complicated question of mixed expenses and expenses that cannot be allocated. What would help the Commission is the expenses that can be allocated and then enter into those that cannot be allocated. It would help if some companies would report all expenses which are actually assignable, designating other expenses as unassignable, unless they desire to submit a complete apportionment, stating the basis used. If 20 roads make such returns, it is quite possible that in those 20 there will be suggestions enough to lead to uniformity for 50 next year. So in working along these matters will develop. If we would put ourselves to the problem like the people in the manufacturing business have put themselves to the problem, I am inclined to believe we could make headway. I realize those differences that exist, and vet the fact remains that they too have these arbitrary apportion-* * I did not mean to convey the imments to deal with.

pression that I had in mind to apportion 100% of the expenses between different classes. In my written communications I intimated that I would oppose it. * * * As for the apportionment of expenses between freight and passenger; they might be divided as far as possible and then the common expenses put in a pot, so to speak. * * * I should hope that the matter of division between passenger and freight should not cause you to pause too long in the elaboration of our operating statistics. In the separation between passenger and freight, here are certain things that have been definitely apportioned to passenger, say 40 per cent., and that leaves 60 per cent. unapportioned. No one can use that. The present proposition is to separate the 40 per cent. and then leave 60 per cent. to any one interested in making the additional separation."

And whereas, The question of formulating rules for the division of operating expenses between freight and passenger was discussed by the Special Committee on Corporate Fiscal and General Accounts prior to the promulgation of the present classification of Operating Expenses, at which time, after full consideration, it was decided that no fixed rules could be made which would apply alike to all

railroads under the varying conditions.

And whereas, This Committee has formulated the following (mentioned) text indicating the items of operating expenses under the existing classifications, which are directly assignable to freight or to passenger, and the question of apportioning expenses common to both classes of service has now been brought before this Committee.

And whereas, While in practical experience some carriers have made division of expenses between freight and passenger, this has been true only in specific cases and subject to the individual judg-

ment of the party making the division. Therefore, be it

Resolved, That this Committee concurs in the view expressed by the Special Committee on Corporate, Fiscal and General Accounts in the year 1907, and that this Committee, after due and deliberate consideration, reiterates that no fixed rule for the division of common expenses between freight and passenger can be devised which will be equitable to all carriers, to the same carrier under all conditions or to all divisions of the same carrier, and be it further

Adopted.

Resolved, That the attention of the Commission be called to the fact that even the partial separation suggested by the Commission of stating the amount of expenses directly assignable to freight or passenger will involve some additional expense to the carriers, with no appreciable benefit to the Commission.

Adopted.

Your Committee, after full consideration, having in mind the facts and conclusions above expressed, formulated a tentative text of those items which directly and in the ordinary course of business

allocate themselves to one of the three classes of service, i. e.,

Freight, Passenger of Common. Such text was reported in
Bulletin No. 59 of November 25, 1912, a copy of which is,
with this report, submitted to each member of the Association. It
should be borne in mind that the text referred to was produced from
the Classification of Operating Expenses now in existence and may
not fit or meet the requirements of the tentative Classification of
Operating Expenses now under consideration.

Your Committee wishes to call your especial attention to its findings in respect to item (d); that is, the determination of a fixed rule or formula for allotting common expenses to either Freight or

Passenger Service.

Your Committe desires also to advise you that it has had brought to its attention the possibility of the Commission requiring earriers to report their operating expenses in the three classes named, i. e., Freight, Passenger and Common, instead of as totals, as heretofore.

It is of great importance that these matters be given careful and thorough consideration by the Association, to the end that the Interstate Commerce Commission may be given the benefit of the best judgment of the Association upon them.

Report of Special Committee to Attend Convention of National Association of Railway Commissioners.

As Received.

Chicago, March 19, 1913.

Mr. M. P. Blauvelt, President of Association of American Railway Accounting Officers, Chicago, Ill.

Dear Sir: Since the last meeting of our Association, this Committee has attended the 24th annual convention of the National Association of Railway Commissioners, held in Washington, D. C., on November 19, 20, 21 and 22, 1912.

The report to that Convention by its Committee on Statistics and Accounts, of which your chairman is a member, dealt with

Assignment of Revenue and Expenses by State Lines.

Study of Terminal Operations. Analysis of Operating Expenses. Revision of Annual Report Forms. Standard Classification of Accounts.

Annual Report Forms for Express Companies.

Wage Statistics.

Efficiency.

Quality of Service, and

Traffic Statistics.

The Railway Commissioners' Committee, in its report, expresses some discouragement in the matter of the 'Assignment of Revenues and Expenses by State Lines,' but was of the opinion that a solution

might be found by giving up the attempt to adopt a straight mileage pro-rate of earnings and substituting therefor a plan allowing something for the terminals, and after deducting that allowance from the revenue, apportioning the remainder on a mileage pro-rate. It will be difficult to find a proper basis for terminal deductions, and one which will be acceptable to the different states.

The study of 'Terminal Operations' was undertaken partly with the idea of its assistance in apportioning revenue to states, and partly for the purpose of determining what is the cost of operating at the

different termini.

The 'Analysis of Operating Expenses' appears to have for its object the determination of the cost of different classes of service. Your committee is in sympathy with the idea of service costs where obtained for the purpose of comparing efficiency of operating depart-

ment representatives under exactly similar circumstances and conditions, but believes that the attempt to determine costs for the purpose of measuring reasonableness of rates will

eventually be abandoned.

In attempting to make a 'Revision of Annual Report Forms' there is danger that the Commission will call for information entailing great expense on the railroads. The intention seems to be to obtain figures which will measure the efficiency, quality of service, and the intricacies of the traffic movements on the various roads of the country. Your committee is of the opinion that such figures will not answer the purpose of the Commission, and that if the railroads are obliged to compile the information, year in and year out for the Annual Reports, the expense will prove to be very burdensome and not justifiable.

Respectfully submitted.

L. A. ROBINSON, J. A. TAYLOR, C. I. STURGIS, Chairman,"

Q. Mr. Parker, will you produce the fifth annual report of the statistics of the Interstate Commerce Commission, entitled "Statistics on Railways in the United States, 1892." Will you read into the record from that report what is set forth on pages 86 and 87 with reference to the division of operating expenses between freight and passenger?

Mr. Eldredge: Objected to as irrelevant and immaterial, having no bearing on any subject at issue in this case, and as patent also, not the best method of proof.

The Master: What do you claim that this proves?

Mr. Wykes: This is the action that the Interstate Commerce Commission took subsequent to this action of the Railway Commissioners. This has been testified to by Mr. Delf and by Prof. Adams, but nowhere has the exact language with regard to it that appeared in the report been put into the case; that is, Mr. Butler called for it from Mr. Delf; he thought it was material; and I called

for it from Prof. Adams because I thought it was material, and if we

both think it is material I think we ought to get the printed history on it.

A. Commencing on page 86, second paragraph:

"Two important changes in the original form have been adopted since 1888. The first of these pertains to the method of making an exhibit of the financial condition of railways. It was at first attempted to secure from the carriers a statement upon a cash basis of all receipts and expenditures during the year. Receipts of the year were classed as 'Resources' and expenditures as 'appropriations of It was found impossible to secure from the carriers a satisfactory statement of this nature. The accounting officers as a rule keep no record of payments and receipts and such a statement if it could be made, was likely to misrepresent the financial condition of the corporation at any particular time. It was recognized that sound methods of accounting ought to show the credits and liabilities of a corporation at the exact moment when a report is called for, and this can only be done by a statement of accruals of assets on the one hand and of liabilities on the other. This modification was in line with the methods of accounting of the best managed railways.

The second change was the abandonment of the attempt to assign operating expenses to passenger and to freight traffic, respectively. This assignment was introduced by the railways many years ago, when the difference in the character of the two services was so marked as to permit it to be made with a fair degree of accuracy.

With the development of railway economy, however, which has resulted in increasing the rapidity of freight trains and the weight of passenger trains, it has been found that not more than half of the items of operating expenses can by any means be assigned to passenger and to freight service. This fact, taken in connection with the fact that the average cost per ton per mile and per passenger per mile, which was obtained upon the basis of the computation in question, was rarely used by Commissioners in judging of fair rates, induced the Railway Commissioners to abandon this classification. The cost per ton per mile and per passenger per mile will be published for the last time in the report for the year ending June 30, 1893."

Q. Will you produce the report of the Association of Railway Accounting Officers of the United States for the year 1913, being the

28th report.

Mr. Eldredge: Object to it, or to the introduction of any part of it, for the reason that it does not prove itself, or that it is published by any authority that makes it competent evidence.

Mr. Wykes: I ask to have the book marked as an exhibt. (Book referred to marked Defts.' Ex. 97,—should be 69,—Parker, June 2.

1914.

Mr. Eldredge: I object to it further for the reason that it is ir-

relevant and immaterial.

The Master: What is the evidence of the authenticity of that that you produce?

Mr. Wykes: I don't know as there is any evidence other than the fact that it is the printed copy of the reports of the Association of Accountants found in all of the railroad offices, procured by us from a railroad accountant and given to us as being the authentic printed copy of the proceedings. I don't know of any copy more authentic.

The Master: Your objections extended to that point as I understand it, that this was not an authenticated document?

Mr. Eldredge: Yes, sir. It does not prove itself in any way, has not certificate of any kind that under any rule of evidence permits it.

Q. Where did you get the book?

A. That book was given to me by an accounting officer of one of the largest railroads entering into the city of Detroit.

Q. What did you ask him for?

A. I asked for the last report of the American Association of Railway Accounting Officers. I might state that I endeavored to get it from Mr. Phillips direct, the Secretary of the American Association, but unfortunately they had sent out their entire supply. I have seen the same volume in libraries in Chicago.

Q. You have seen the same volume in what libraries?

A. In John Grearrar library in Chicago.

Mr. Wykes: I desire to offer in evidence the part of this report found between pages 97 and 105, which refers to the division of expenses between passenger and freight, and which is as follows:

Mr. Eldredge: I object to the reception of any part of the contents of the volume for the same reason that I objected to the volume, and for the further reason that the views of Commissioner Meyer expressed in a letter are not admissible in evidence. If the facts he testifies to are material, he should be producd, so as to be subject to cross examination.

From the Report of the Standing Committee on Corporate, Fiscal and General Accounts to the Twenty-Fifth (1913) Annual Meeting of the Association of American Railway Accounting Officers, as

adopted.

"Your Committee has held three meetings during the current year, as follows:

French Lick, Ind., November 13 and 14, 1912.
 Washington, D. C., January 9 and 10, 1913.
 Atlantic City, N. J., April 1, 2 and 3, 1913,

and begs to report the following results and conclusions reached by it, which are respectfully submitted for your consideration.

First.

Subject: Statistics—General.

This general subject, dealt with but briefly in the 1912 report, is, in the opinion of your Committee, of such importance as to war-

rant a full explanation of its history at this time, to the end that the Association may be made fully acquainted with the Committee's work in respect to it, as well as its present status.

During the autumn of 1911, the Interstate Commerce Commission, through Commissioner Meyer, addressed letters to chief executive offi-

cers of various railways similar to the following:

'The Interstate Commerce Commission has under contemplation a revision of the blank forms whereon it receives the monthly and annual reports of steam railway carriers, and in connection therewith a careful consideration of the matter of railway operating statistics seems advisable. The Commission recognizes that in this work the expert knowledge and advice of railway officers would, if ac-

corded, be of great assistance.

The purpose of this note is to express the Commission's appreciation of the valuable aid which has been heretofore rendered in many ways by representatives of the railways, and particularly in the matter of developing the Uniform System of Accounts now nearing completion so far as relates to Steam Railways, and also to advise that if similar aid could be given to the Commission in the revision of its annual and monthly report forms and in the development of an adequate scheme of operating statistics, such aid would not only be highly appreciated by the Commission, but it would make possible a more perfect piece of work than could be otherwise achieved.

"The Commission believes that the best results can be reached by making a thorough study of the subject in all of its phases by the Commission's representatives and the representatives of the Railways in co-operation, bearing in mind all matters of importance that may be in any way affected by publicity of reports and the various uses to

which operating statistics may reasonably be put.

872 'A few phases of the general plan of the Commission are fairly well defined and the status of its official work in this respect is such that prompt action is deemed advisable. For the most part, however, the Commission has determined upon no fixed line of action nor plan of procedure with respect to either the report forms, or the development of operating statistics.

'A letter identical with this is sent to the President of every other railway represented upon the Committee on Corporate, Fiscal and General Accounts of the Association of American Railway Account-

ing Officers.'

Apparently the replies received by the Commissioner to such letters made inquiry as to the details desired and the scope of the work to be undertaken. This assumption is based upon a subsequent round letter issued by Commissioner Meyer in December, 1911, a copy of which follows:

Interstate Commerce Commission,

Washington.

December 2, 1911.

DEAR SIR: Partly in acknowledgment of the last letter received from executives of railways represented on the Committee on Corpo-

rate, Fiscal and General Accounts, and partly as a supplementary answer to earlier replies, I am addressing this communication to the presidents of all the railways represented on that Committee.

At the outset I am pleased to be able to report that the replies to all the communications from this obice show a gratifying spirit of co-

operation with proposed work.

In one form or another, quite a few of them express the desire of receiving from the Commission more specific suggestions with respect to the lines of inquiry to be pursued. This request is a very fair and reasonable one, and I therefore beg to be permitted to submit

reasonable one, and I therefore beg to be permitted to submit certain suggestions. It must be borne in mind, however, that these suggestions come from me personally and individually, and not from the Commission as a whole, although I have every rea-

and not from the Commission as a whole, although I have every reason to believe that my colleagues will endorse the general plan herein outlined whenever the same may be presented in its elaborated form

for official approval.

All the different lines of inquiry suggested heretofore, and every line of investigation which may be suggested herein, constitute, after all, only a single large problem, namely, the problem of analyzing operating expenses and of reporting the results of the statistical compilations showing this analysis, in the most practicable and useful manner.

Attention has frequently been directed to the relative futility of requiring small local roads, that are technically interstate in character, to make annual and other reports which are in every respect identical with those required of the largest systems. It seems to me worth while to deliberate, at least briefly, upon the expediency of classifying interstate carriers into two or three different classes, and requiring simpler and briefer reports from the less important ones.

The Committee on Statistics of the National Association of Railway Commissioners was instructed to inquire, among other things, into the possibility of adopting a report form which will meet the requirements of the Interstate Commerce Commission, as well as the substantial requirements of the State Commissions. In other words, the aim is to unify all reports to such an extent that interstate carriers will compile only one report and send copies of this report to the Interstate Commerce Commission and to the State Commissions

of the respective states in which they operate. The advantages of a single report, if one can be devised, and adopted, are obvious, and it certainly is worth while to inquire carefully

into this proposal.

A number of the replies received express the view that the present annual reports and the compilations based thereon, embrace items, columns or tables which have relatively little value compared with the time and expense required in their preparation. I believe that both the annual report form and the annual publication entitled 'Statistics of Railways in the United Stattes' should be very thoroughly examined with a view of eliminating all items, columns and tables which cannot be justified from the point of view of utility, effort and expense.

In the matter of operating statictics consideration should be given

to the necessity and feasibility of adopting certain new statistical units and of standardizing existing ones. Should such items as gross tonnage, locomotive service hours, etc., be compiled? Careful inquiry should be made to ascertain to what extent statistical units already adopted, or to be adopted, do not stand for the same thing in regard to different carriers. This suggestion is not made in the hope of securing compilations of statistics which are necessarily comparable at their face value for all the railways in the United States. It is to be presumed that all statistics must be interpreted in the light of the conditions under which the carrier to which they apply conducts its business. It should, however, be possible to secure figures which are comparable within these limitations.

Questions will doubtless be asked regarding the use to which these statistics shall be put. My answer is to whatever purpose they can fairly and honestly be applied by any one whatsoever, whether Court, Commission, Railway Company, Bank

Investor or private citizen.

Much has been said regarding 'Efficiency Accounting.' It is immaterial to me whether we use the term 'Efficiency Accounting,' 'Economy Accounting,' or 'Cost Accounting,' or any other proper descriptive term. They all come to the same thing, namely, a detailed analysis of operating expenses with a view of reflecting the actual results of operation and generally the creation of a statistical consciousness for every important operating property. From the point of view of a large class of controversies constantly being submitted to the Commission for adjudication, it is extremely desirable, almost vital, to have for consideration statistical information throwing light upon the cost of operation, both absolute and relative.

From the point of view of the railway companies as private organizations, it seems to me that carefully compiled statistical data will have value in many diverse directions. What operating official will not study with profit comparative statistics relating to fuel consumption, cost of labor, repair of equipment and many other similar items? I do not believe that any one can foretell or foresee the manifold ways in which statistical information of the character I have in mind can be applied with profit to all the parties who are interested in the conduct of the business. It is quite probable that many uses will be discovered as the work proceeds and as the results of this work

accumulate year by year.

among the different branches of the business has been raised. This idea is as old as the railways. I believe such a separation should be undertaken as far as it can be correctly done without unnecessarily suggesting misleading conclusions. I have long felt that every useful scheme of operating statistics rests upon such a separation. I regard this separation as fundamental, and unless hitherto unthought of objections can be raised, I assume that all carriers will co-operate in doing it in the future, as some of them have done it for many years past. A beginning could be made by reporting all expenses which are assignable to passenger, freight and other branches of the business under existing classifications. All those expenses

which cannot be directly assigned, should be reported unassigned unless the carriers voluntarity desire to submit a complete apportionment. Such apportionments have been made very elaborately for important systems and the Commission would certainly wish to get the benefit of this work; but I should be opposed, for the present at least, to any plan looking toward the assignment or apportionment of all expenses of every class to the respective branches of the business in reports to be made to this Commission. If the Commission is in possession of the figures representing expenses which are actually assignable, it can, if necessary, go beyond this, stating for the information of all concerned, the bases more or less arbitrarily adopted for common items and the reason for their adoption in every individual case. I should be inclined to recommend the adoption of a report form which will leave it optional with the different carriers to report separately only the assignable expenses, leaving

common expenses unapportioned, or to report a complete apportionment. In case the latter alternative is elected, however, each carrier should be required to state the basis upon which it made its apportionments and the reason for adopting that particular

basis.

These are only general suggestions which may be regarded as talking points. I shall endeavor to follow the details of the deliberations of the Committee which is to undertake this work and to attend its sessions as frequently as possible. The Commission will be represented at all of these meetings by its Statistician and its Associate Statistician.

Very respectfully, (Signed)

B. H. MEYER, Commissioner.

It would also appear that a majority, if not quite all, of the Chief Executives addressed delegated their Accounting Officer to pursue this work with the Commission, its representatives or with both; and acting upon such instructions, your Committee, at a meeting held in Louisville, Ky., January 8, 9 and 10, 1912, passed the following resolution:

Resolved, That a subcommittee of eight, of which the Chairman of this Committee shall be chairman, be appointed by such chairman, to confer with the Interstate Commerce Commission or its representatives, or both, on the subject of Statistics; such subcommittee

to report to this Committee.

Since that time the sub-committee, as well as the full committee, has diligently pursued the matter in co-operation with representatives of the Commission. The subjects thus far presented to your Committee in respect to the general question are:

(1) The determination of those operating expenses which may be directly allocated to:

(a) Freight Service.(b) Passenger Service.

878 (c)

(c) Service common to both freight and passenger service; or, in other words, those expenses which cannot be accurately assigned to either Freight or Passenger Service.

(d) Consideration of fixed formulæ or rules for allocating common expenses to Freight Service and to Pas-

senger Service.

(2) Traffic Statistics.

(3) Modification of the form of annual report to the Interstate Commerce Commission, which carries with it consideration of the various statistical tables therein required.

Your Committee submits the following report upon each of these subjects:

Subject: Statistics—Division of Operating Expenses Between Passenger Service and Freight Service.

In reference to the question of the allocation of operating expenses to passenger service and to freight service, your Committee presents the following:

Whereas, Commissioner B. H. Meyer, in his letters to the presidents of sundry railroads, in referring to division of operating expenses between passenger and freight, used the following language:

'I am advised that the question of separating expenses among the different branches of the business has been raised. This idea is as old as the railways. I believe such a separation should be undertaken es far as it can be correctly done without necessarily suggesting misleading conclusions. I have long felt that every useful scheme of operating statistics rests upon such a separation. I regard this separation as fundamental, and unless hitherto unthought of objections can be raised, I assume that all the carriers will co-operate in doing it in the future, as some of them have done it for many years past. A beginning could be made by reporting all expenses which are assignable to passenger, freight and other branches of the business under existing classifications. All these expenses which cannot be directly assigned, should be reported unassigned, unless the carriers voluntarily desire to submit a complete apportionment. Such apportionments have been made very elaborately for important systems, and the Commission would certainly wish to get the benefit of this

work; but I should be opposed, for the present at least, to any plan looking toward the assignment or apportionment of all expenses of every class to the respective branches of the business in reports to be made to this Commission. If the Commission is in possession of the figures representing expenses which are actually assignable, it can, if necessary, go beyond this, stating for the information of all concerned, the bases more or less arbitrarily adopted for common items and the reason for their adoption in every individual case. I should be inclined to recommend the adoption of a report form which will leave it optional with the different carriers to report separately only the assignable expenses, leaving common expenses un-

apportioned, or to report a complete apportionment. In case the latter alternative is elected, however, each carrier should be required to state the basis upon which it made its apportionments and the reason for adopting that particular basis.'

And whereas, in his remarks before a subcommittee of this Committee at Washington, D. C., February 8, 1912, he reiterated that

opinion, using the following language:

One of my suggestions was that, putting aside all controversy with respect to the separation of expenses between the different branches of the business, carriers might report all expenses assignable to passenger, freight and other branches of service under existing classifica-As I see it from the point of view of the Commission, I feel that this is fundamental. * . * It is axiomatic with you that before we can have anything in the way of cost, we must have a separation of expenses. Then, of course, you come into the complicated question of mixed expenses and expenses that cannot be allocated. What would help the Commission is the expenses that can be allocated and then enter into those that cannot be allocated. help if some companies would report all expenses which are actually assignable, designating other expenses as unassignable, unless they desire to submit a complete apportionment, stating the basis used. If twenty roads make such returns, it is quite possible that in those twenty there will be suggestions enough to lead to uniformity for fifty next year. So in working along these matters will develop. we would put ourselves to the problem like the people in the manufacturing business have put themselves to the problem, I am inclined to believe we could make headway. I realize those differences that exist, and yet the fact remains that they too have these arbitrary ap-* * I did not mean to convey the portionments to deal with. impression that I had in mind to apportion 100% of the expenses between different classes. In my written communication I intimated that I would oppose it. * * * As for the apportionment of ex-As for the apportionment of expenses between freight and passenger; they might be divided as far as possible and then the common expenses put in a pot, so to speak. I should hope that the matter of division between

passenger and freight should not cause you to pause too long in the elaboration of our operating statistics. In the separation between passenger and freight, here are certain things that have been definitely apportioned to passenger, say 40 per cent, and that leaves 60 per cent unapportioned. No one can use that. The present proposition is to separate the 40 per cent and then leave the 60 per cent to any one interested in making the additional separation.'

And Whereas, The question of formulating rules for the division of operating expenses between freight and passenger was discussed by the Special Committee on Corporate, Fiscal and General Accounts prior to the promulgation of the present classification of operating expenses, at which time, after full consideration, it was decided that no fixed rules could be made which would apply alike to all railroads under the many varying conditions.

And Whereas, This Committee has formulated the following (men-

tioned) text indicating the items of operating expenses, under the existing classification, which are directly as ignable to freight or passenger, and the question of apportioning expenses common to both classes of service has now been brought before this Committee.

And Whereas, While in practical experience some carriers have made division of expenses between freight and passenger, this has been true only in specific cases and subject to the individual judg-

ment of the party making the division. Therefore, be it,

Resolved, That this Committee concurs in the view expressed by the Special Committee oj Corporate, Fiscal and General Accounts in the year 1906, and that this Committee, after due and deliberate consideration, reiterates that no fixed rule for the division of common expenses between freight and passenger can be devised which will be equitable to all carriers, to the same carrier under all conditions or to all divisions of the same carrier, and be it further,

Adopted.

Resolved, That the attention of the Commission be called to the fact that even the partial separation suggested by the Commission of stating the amount of expense directly assignable to freight or passenger will involve some additional expense to the carriers, with no appreciable benefit to the Commission.

Adopted.

Your Committee, after full consideration, having in mind the facts and conclusions above expressed, formulated a tentative text of those items which directly and in the ordinary course of business allocate themselves to one of the three classes of service, i. e., Freight,

Passenger or Common. Such text was reported in Bulletin
No. 59 of November 25, 1912, a copy of which is, with this
report, submitted to each member of the Association. It
should be borne in mind that the text referred to was produced from

the classification of Operating Expenses now in existence and may not fit or meet the requirements of the tentative classification of Operating Expenses now under consideration.

Your Committee wishes to call your especial attention to its findings in respect to item (d); that is, the determination of a fixed rule or formula for allotting common expenses to either Freight or Pas-

senger Service.

Your Committee desires also to advise you that it has had brought to its attention the possibility of the Commission requiring carriers to report their operating expenses in the three classes named, i. e., Freight, Passenger and Common, instead of as totals, as heretofore.

It is of great importance that these matters be given careful and thorough consideration by the Association, to the end that the Interstate Commerce Commission may be given the benefit of the best judgment of the Association upon them."

Mr. Wykes: I also wish to offer in evidence, and do so, the parts of the report found between pages 59 and 72, an address given by Mr. R. A. White, Auditor of the New York Central.

Mr. Eldredge: That is objected to for the same reason that I objected to the volume or any part of its contents, and for the further reason that it gives Mr. White's views without opportunity of cross examination.

Q. Will you produce the printed copy of the affidavits filed in this case on the motion for temporary injunction, and the affidavit contained therein between pages 4 and 10 made by Mr. Delf on July 24, 1911?

882 A. Yes, I have that.

Mr. Wykes: I wish to introduce that affidavit in evidence.

Mr. Eldredge: I object to it upon the ground that the single affidavit is not admissible in evidence unless all the affidavits covering the same subject are also introduced. I suggest, Mr. Wykes, that this affidavit be not written into the testimony, but, if it shall be found to be material, it may be referred to by either party from the original affidavit, forming a part of the files in the case. The printed copy may be used subject to correction by the original.

Q. Will you produce the record of certain methods for the division of expenses between passenger and freight prepared by J. P. Muller in the case of Boilleau against the Pittsburgh & Lake Erie Railroad Co.? All I want it for is for the purpose of showing the methods for the division of common expenses applied in other cases—just for the purpose of showing the diversity of methods and the details of methods in other cases. That will be marked Ex. 98 (should be 70.) That is the Muller that has already been referred to in the testimony.

Mr. Eldredge: Mr. Wykes, I understand that this volume which you have marked Defts.' Ex. 98 (should be 70) contains certain exhibits prepared by J. P. Muller purporting to show the methods adopted by different accountants for the allocations of operating expenses to passenger and freight service respectively in certain railway rate cases, and that you propose to introduce in evidence the matter contained on pages 11 to 122 of this Ex. 98 (70)?

Mr. Wykes: That is correct, for the purpose of indicating the methods applied in the division of operating expenses only.

Mr. Eldredge: We will not object to the method of proof; in other words, we won't object to the method of proof; prove itself, but we do object to the introduction of the pages named for the reason that they are irrelevant and immaterial, and for the further reason that they would only be admissible in evidence if J. P. Muller were produced and an opportunity given to cross examine him.

Q. Will you produce the first annual report on the statistics of railways of the United States for the year ending June 30, 1888?

A. I produce a copy of that report, and I read in evidence from pages 17 to 19 inclusive the following:

Mr. Eldredge: I object to it as irrelevant and immaterial.

"As the previous table considered all forms of ordinary income, so this table includes all expenditures except such as are incurred for permanent improvements or betterments in the financial condition of the property. Expenditures are brought under the two heads of

operating expenses and fixed charges.

To operating expenses are charged maintenance of way and structures, maintenance of equipment, conducting transportation, and general expenses; and in each case the amounts so charged are assigned to freight and to passenger service. Under fixed charges are included interest on bonds, rentals, and taxes. The table closes with estimates of expenditures for one passenger or one ton of freight carried one mile, and for the cost of running a passenger or a freight train one mile.

There are two questions of importance suggested by the analysis of expenses portrayed in Table IV. The first question has reference to the classification of expenses under the four heads stated above; the second pertains to the apportionment of expenses to passenger

and freight service.

With regard to the first of these questions, as stated in the Commission's report, on page 67, 'the distribution into four general classes was determined upon as the most scientific and satisfactory of the various systems in use, while the subordinate heads under each class are so arranged as to require no important change from what is known as the Saratoga classification of operating expenses, which was agreed upon by a convention of State Commissioners at Saratoga, June 10, 1879, and which has been quite generally adopted in actual use.' And certainly where one looks into this classification it appears simple, adequate and workable; and it is a pleasure to add that many roads that have not previously done so are now adjusting their accounts to its requirements.

The question which arises in connection with apportionment of expenses between passenger and freight service is one that cannot be determined with such confidence. One point only respecting it lies beyond the limit of reasonable controversy, and that is that such ap-

portionment must in some manner be made.

Not only is this demanded in the interest of comparative statistics, but it is of great importance for an intelligent judgment on relative freight and passenger charges. But when the proper rule for making the apportionment of expenses comes to be considered, it is necessary, in the presence of the many and conflicting theories entertained by competent railway accountants, to proceed with great caution.

The rule adopted by the Commission, as contained in its book of instructions for the guidance of carriers in making their annual re-

ports, is as follows:

All expenses which are naturally chargeable to either freight or passenger traffic should be entered in their respective columns; expenses which are not naturally chargeable to either traffic should

be apportioned on a mileage basis, making the division as between freight and passenger traffic in the proportion which the freight and passenger train mileage bears to the total mileage of trains earning revenue. With few exceptions this rule has been followed by the carriers in making their reports, and the results exhibited in the tables show the manner of its working. There is, of course, no difference of opinion, so far as the expenses 'naturally chargeable to either freight or passenger traffic' is concerned. The difficulty arises in connection with such expenses as cannot be so apportioned. For example, how can it be determined what proportion of the cost of maintaining a

road-bed in good order is chargeable to freight revenue?

The confusion that exists on this subject may be best indicated by stating the various theories respecting it. According to the rule given above, expenses which from their nature cannot be easily assigned are to be apportioned on the basis of train mileage. This is thought to allow more nearly than any other arbitrary rule for the varying elements of velocity and weight. If freight trains are heavier than passenger trains, the latter are ordinarily run at higher speed, and, as is well known, the 'pound' of a train on the rail is measured by its momentum, or the resultant of velocity multiplied by weight. Curves, grades, temperature, and other factors which vary with physical characteristics of the road or with the locality in which it is built, may be regarded as constant so far as freight and passenger service is concerned.

But this rule of apportionment fails to gain acceptance by many accountants who have had large experience in railway affairs. Some claim that an apportionment fair to all branches of the railway service is impossible. They who maintain this position assume that

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operating expenses should be taken as a whole, and they conceive the whole duty of the manager to have been performed if at the close of the fiscal year there remains a satisfactory

margin of earnings. It is urged by others that the only solution of the problem is to determine the ratio of apportionment for those items of expense that can be readily traced to passenger and freight service, and then to adopt this ratio for apportioning the other items.

This position is less satisfactory than the one previously stated, for it gives the appearance of a solution when in reality it is but an evasion of the problem. There are other accountants who use car mileage as the true basis of apportionment; others substitute for this engine mileage; still others declare that mileage run has nothing to do with the question, and that weight of trains alone should be considered. In German and Swiss statistics the number of axles in a train serves as the basis of most comparative and proportional computations, and it is possible that further study would reveal yet other theories.

In the presence of such divergence of opinion as is disclosed above, it is certainly well to refrain from hasty judgment. The question is one to be determined by careful investigation and comparative study. But in reading the letters of the several railway officers who have favored the Commission with arguments upon this subject, one thought has presented itself that may prove the source of fruitful inquiry. It happens that the several accountants who hold the theories referred to are officers of roads that differ widely in their physical characteristics, as also in the nature of the competition to

which their business must conform. In one case the road-bed is straight and over a level country, in another there are sharp curves and heavy grades; one road is obliged to depend for supremacy

can run its trains according to requirements of economy; the average temperature and humidity, also, which must affect somewhat the wear and tear of structures and equipment, are different for the several roads. Now, it is possible that divergence of opinion as to the proper method of apportioning expenses between freight and passenger service is due to the varying conditions under which the problem has been considered; and if this be true, it is of course impossible to discover any single rule to satisfy the problem. This can only be determined by applying the several rules under different conditions and comparing the results.

Such a method of procedure would be scientific, and must lead to trustworthy results. It is proposed in this office to undertake such

an investigation.

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On June 26, 1914.

PARKER recalled.

Further redirect examination.

By Mr. Wykes:

Defts.' Ex. 74, Parker, is the details of ratios, and pages 1 to 52 contain the detailed working out of the gross ton mile ratios 1, 1a and 1b for 1913 according to the method of Thompson. Defts.' Ex. 77, Parker, is a copy of the assignments and allocations of the 1913 expenses on the Thompson plan or basis. It comprehends the application of the ratios for 1913 to the expenses of plaintiff for that year.

There are three variations shown from 1912 to 1913 in the application of the ratios. The first is that I used for account No. 2, Ballast, a six-year average, instead of a five-year average as used by Thompson

in 1912; that is shown on page 57 of Ex. 77.

In account No. 9, Bridges, Trestles and Culverts, I reduced the total by \$20,986, cost of betterments included in operating expenses,

as testified to by Mr. Delf.

For account No. 55, Advertising, page 105 of Ex. 77, I distributed the account relatively with the distribution of the same by Mr. Heiss for 1912.

For account No. 54, I accepted Delf's assignments or allocations, the data being taken from Defts.' Ex. 48, Delf. This account is Out-

side Agencies.

The tables in Defts.' Ex. 77, Parker, are comparable with those in Defts.' Ex. 72, Thompson, page for page, and, if there is any variation in accounts, it will show up.

The sixth year which I used for 1913, in averaging ballast by including 1913, was not available when Thompson arrived at his average in 1912. The expenditures for ballast, 1908 to 1912 in-

889 clusive, were \$19,947.53, an average per year of \$3,989.50. The inclusion of the 1913 expenditures, of \$25,938, almost

doubled the average.

Ratio 2, 1913, of equated track miles, shown common passenger and freight as 86.27%, freight and ore, 13.57%, and exclusive passenger, .16%. Mr. Thompson's attention was called to some testimony, which came into the case after his ratio was arrived at, indicating that a part of the exclusive freight trackage was maintained by the industries served thereby, which made a slight difference in his percentage. My percentage for Ratio 2 was arrived at without separating the tracks maintained by the industries. Separating that trackage, results would be, common freight and passenger, 87.26%, freight, 12.58%, and passenger, .16%. The change would not make a difference of over \$150 in the intrastate passenger costs.

The expenses used as the starting point and divided in Ex.. 77 are taken from Delf's exhibits or from the books of plaintiff. Ex. 77 correctly represents what it purports to show, though there is one error, to which Delf has called attention, that may affect the result in

the intrastate passenger business \$2,000.

I am referring to the item "Superintendence," where there is an apparent error of \$1,338. The error, if such, will by correction result in increasing the passenger cost approximately \$2,000. It is purely clerical, as the result of misreading an amount.

In Ex. 77, it was my effort, design and attempt to correctly apply the Thompson method of assignment and allocation, and to produce correct results on that method. I have done everything I could to avoid error. (Defts.' Ex. 77, Parker, introduced in evidence.)

The division of Ex. 77 which states a part of the cost of operation of sleepers and diners, including the roadway and other costs incident thereon, includes the foreign Pull sleepers and diners.

In Ex. 77, I varied from Thompson's 1912 assignments, in that I assigned a part of the item "Docks and Wharves" to Michigan passenger business, while he excluded that entirely, on the theory of its being connected with the separately-operated property. I included it, accepting Delf's passenger assignments, assigned it on the basis of passenger cars passing over the dock, and subdivided in to passengers and baggage, mail and express, and sleepers and diners.

PARKER.

Cross-examination.

By Mr. Cotton:

The 1913 ballast figures would be first available about Oct., 1913. In account 81, Enginehouses and road expenses, I did not include the

mileage of helpers and pushers, nor did Thompson.

The C. & N. W. train brings a sleeper, destined for Marquette, which comes on to the line of plaintiff at Negaunee; that car is transferred to the C. & N. W. train at Negaunee, to be pulled down to Marquette; that train is No. 110. The train that brings the sleeper to

the South Shore, when it comes on to the tracks of South Shore at

Negaunee, becomes No. 3.

There is a somewhat similar operation at Champion, where the C. M. & St. P. connects with South Shore, and brings a train to the South Shore in which they have a sleeper for Marquette, which is picked up by No. 10, I believe, and carried to Marquette.

At Marquette, for this train No. 10, and for train No. 110, the switch engine has to take those sleepers from each of the trains and spot them over on a sidetrack, near the station. At night, about five o'clock, those sleepers are again set up into a train—No. 11—and moved back, the C. & N. W. sleeper being carried to Ishpeming, where transfer is made to the C. & N. W., and the St. Paul sleeper being carried back to Champion, where the transfer is made to the St. Paul.

In the dining service of those C. & N. W. and C. M. & St. P. trains which are under D. S. S. & A. power, the diners have been set off at various places, one time and another, but I think the more recent operation is to set them off at Houghton, and set them in again at

Houghton.

Train No. 7 brings a sleeper from the Soo to Marquette; that sleeper is dropped at the station. I have never observed the entire operation by which it is again taken up by No. 8 and carried back to the Soo. After it is dropped from No. 7, it must be placed in position so it can be easily attached to No. 8 when it goes east.

There is always a transfer of sleepers at Soo Jct. twice a day. In each instance, it is taken out of the train on which it comes to that point and put into another train. The switching operations by which these cars are put on to the boat at St. Ignace is complicated by heavy

cars and sleepers and diners.

The outside operations account is not burdened with any of the transportation expenses or the expense of such movements as described. There is no separation of the cost of switching or wear on the track, or such things, and no way to get at the cost, except on some basis of apportionment or assignment.

892 (All of the various exhibits marked as defendants' exhibits throughout the case are introduced in evidence, subject to objections made thereto in the course of the proofs.)

(This witness was later called to testify before the Court.)

United States of America, Eastern District of Michigan, 88:

I, Elmer W. Voorheis, Clerk of the District Court of the United States for the Eastern District of Michigan, do hereby certify that the above and foregoing is a true copy of Volume 2 of Narrative Statement of Testimony on Appeal, comprising typewritten pages numbered three hundred and eighty-seven to eight hundred and ninety-two inclusive, in the therein entitled cause as the same appears on file and of record in my office; that I have compared the same with the original, and it is a true and correct transcript therefrom and of the whole thereof.

In testimony whereof, I have hereunto set my hand and affixed the seal of said Court, at Detroit, in said district, this twenty-first day of November, in the year of our Lord one thousand nine hundred and eighteen, and of the Independence of the United States of America the one hundred and forty-third.

[Seal of the U. S. District Court, Eastern District of Mich.]

ELMER W. VOORHEIS, Clerk.

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Vol. 3.

On August 14, 1913.

Prof. HENRY C. Adams, a witness called by defendants.

Direct examination.

By Mr. Wykes:

I graduated from Iowa college, with the regular Bachelor's degree. I then graduated as a Ph. D. from Johns Hopkins University, with economics, finance and history as subjects. I then taught these subjects in Cornell University, Johns Hopkins University and University of Michigan, until 1887, when I went to the University of Michigan, taking a full appointment. In 1888, I became statistician to the Interstate Commerce Commission, remaining in charge of its statistical and accounting work until two years ago.

With regard to railway accounts, in addition to unifying the state reports, early in my connection with the I. C. C., after the Hepburn Act, in 1906, I took charge, for the Commission, of the unification of railway accounts in the United States, giving up two years from university work. Throughout all this time, I have had to do with the many technical and practical questions arising in governmental questions of railway supervision.

The classification of accounts of the Interstate Commerce Commission was entirely devised and put into force between 1888 and 1911, when I was its statistician. Of that, I had full supervision, so far as the I. C. C. was concerned. That work was done in co-operation with the accountants of the railroads of the United States. I had full supervision of that entire branch of the Commission's work, which began as the division of statistics and ended as the division of statistics and accounts; the accounts were added in 1907, after the Hepburn Act, the reason being that until that time the Commission practically had no control over accounts. I had full control over the development of that system.

I served as special expert of the Railway Mail Pay Commission, composed of members of the United States Senate and of Congress, and the report made has been regarded as the standard to this time. It is always used in subsequent discussions.

I was connected with the Michigan Railroad Appraisal of 1900, being responsible for the non-physical valuation; the appraisal was divided into two parts, the physical valuation and the valuation of the commercial evidence, or value in excess of the physical value. I was later connected with Michigan railroad appraisals of 1902 and 1905.

Since severing my connection with the Interstate Commerce Commission, I have had quite a number of statistical and accounting cases which required a general review of the principles laid down in the I. C. C. system of accounts, and some having a bearing on the rate-

paying ability of railroads.

I have studied the question of dividing costs in railway transportation, so as to get at the cost of the different characters of traffic: that is called the rule for specific costs for specific services. That was the first question I took up when I became statistician to the 1. C. C., bearing upon the use of statistics in rate cases. I was a member of the committee composed of State and Federal Railway Commissions that recommended the abandonment of any attempt to separate expenses into passenger and freight. In recent years, I have had a great deal to do with that question. The most important case was when I prepared an analysis that criticized that theory in detail for the American Railway Association.

The abstract of my testimony in the Michigan railroad tax cases correctly sets forth matters bearing upon my qualifications as an ex-

pert, as follows:

895 2. Member of following societies:

Member and late vice-president, American Statistical Association. Member and late president, American Economic Association.

Member, International Statistical Association.

Member, International Association for Procuring Uniform Legislation.

3. Writings (excluding pamphlets and articles) on subjects related to this inquiry:

History of Taxation in U. S., 1789 to 1816. (Translated into German.)

Public Debts. (Translated into Japanese.)

The Science of Finance. (Translated into Japanese.)

Statistical Reports of Interstate Commerce Commission, 1888 to 1902.

Compendium of Railways of the U. S., 1902 (3 parts).

Two Volumes on Transportation for U. S. Census Report of 1900. Special attention given to subject of History and Evolution of Taxation of Railways in the U.S.

I was an expert agent in charge of transportation work in the United States Census of 1890. I was statistician for the Postal Service Commission in 1899; that is what I referred to as doing expert

work for the Postal Commission.

Since the I. C. C. was created, there have been many attempts, and there are many different rules, for making separation of costs of freight and passenger business; many experts have attempted the separation, and, as a result, a great many different methods have been worked out. I have in mind eight or ten different methods for the separation between passenger and freight.

I was one of the committee recommending the abandonment of the rule of specific costs by the I. C. C., and the costs per ton and per passenger per mile were published for the last time in the report for

the year ending June 30, 1893; the recommendation was made a year previous to that time.

896 ADAMS.

Cross-examination.

By Mr. Eldredge:

In the absence of the record of purchases, I think a railroad is entitled, as a matter of justice and equity, to only the average value of the lands in the territory it serves, and it would give the railroad too high a value for its right of way to take sales of lands imme-

diately adjoining the right of way.

That goes to the question of what element of railway property ought to be valued on the cost-of-reproduction theory. I deny, absolutely, that lands should be valued in that way. I think a thing that can be reproduced, like a locomotive, can be valued on the cost-of-reproduction theory, and a thing that cannot be made in unlimited quantities, at uniform cost, ought never to be valued along those lines. I think it is much better to take the average value of the property served than to take the contiguous property, to value the railroad land. I think it fairer to the public, and to the railroad, as well, as I do not concede anything which is unfair to one party could be fair to the other. I think there is a harmony of interest.

ADAMS.

Direct examination resumed.

By Mr. Wykes:

The rule for the ascertainment of specific costs for specific service

at one time used by the I. C. C. is as follows:

"All expenses which are naturally chargeable to either freight or passenger traffic should be entered in their respective columns; expenses which are not naturally chargeable to either traffic should be apportioned on a train mile basis, making the division as between freight and passenger traffic in the proportion which the freight and passenger train mileage bears to the total mileage of trains earning revenue."

This rule was included in the instructions to the carriers for annual reports to the I. C. C. The division between passenger and freight service of the operating expenses was required for the last time in 1893, and appeared for the last time in the report of 1894. Preliminary to the abandonment of that tule, action with regard to it was taken in the meeting of the Association of Railroad Commissioners.

The resolution of the Association of Railroad Commissioners of 1892, voting to eliminate that requirement, was printed in the proceedings of the Association, which has always been printed by the I. C. C. It is not included in the report of the Commission to Con-

gress, nor are these proceedings included in the annual report of statistics to the Commission. I have not with me a copy of the en-

tire resolution, but one paragraph of it is as follows:

"The test of actual practice fails to satisfy us that these rules are of any utility either to the companies, the States or the Nation. Indeed if not substantially correct they could not be expected to be useful and may prove positively vicious. We know that results have been reached by the application of these rules for division which are grossly erroneous, not to say preposterous."

Q. I think you stated that the division of expenses between various classes of traffic, such as freight and passenger, and interstate passenger and interstate freight, and intrastate passenger and intrastate freight, has been attempted a good many times by different

experts?

A. Yes sir.

Q. And that those experts differ materially in the factors upon which they make their division of the common expenses?

A. That is true.

Some of the factors used by experts, in making the division of that portion of operating expenses that cannot be directly assigned

to passenger or freight services, are: One factor is car mileage; another is the ratio of direct charges; another may be
called the dollar of revenue method; another is revenue;
another is locomotive mileage; another is the revenue train mileage;
and there is one which is a combination of the locomotive mileage
and the car mileage. Those are all of the factors I am acquainted
with, although there are quite a number of minor principles adopted
in the development of the full methods of various experts, but these

are the leading factors, so far as I know them.

Train weights are used as a modifier in some of the methods, and some have made use of the time and use of track and property by the different classes of traffic, but the greatest use of that, as I understand it, is in connection with the localization of property to the various services, and not the separation of expenses; however, that has been used. I have studied the work of experts, or men professing to be experts, who have attempted divisions of costs. I have studied certain methods by different experts who make use of each of these various factors in greater or less degree in assigning common costs between passenger and freight. Some expert has used all of these factors, with the exception of the dollar of revenue method.

I have studied the rule promulgated by the Postmaster General in his method for separating between passenger and freight to arrive at the railway mail pay. I have studied the rule of Frank Nay, Auditor of the Rock Island, in the Advance Rate Cases before the I. C. C.; also the method of John G. Drew, Comptroller of the Great Northern, in a case before the I. C. C.; also the method of J. P. Muller in the Pittsburgh Coal Rate Case, and the method used by the I. C. C. prior to 1894; also the rule used by James Peabody, Statistician of the Atchison, Topeka and Santa Fe. Of course, some

of these men have appeared in many cases, and there are other rules than these I have given. Hillman has made a great many assignments applying rules in the Ohio Lake Cargo Rate Case, in what is known as Hillman's Florida formula before the I. C. C., in Hillman's South Dakota formula before the I. C. C., in Hillman's Minnesota formula before the I. C. C., in Hillman's Hocking Valley formula before the I. C. C., and Hillman's formula in Norfolk & Western. These formulas differ as to the application of these fundamentals in the different cases. Hillman's rule varies with the cases. Mr. Worthington appeared as an expert in the Pittsburgh Vein Operators Association Case vs. Wheeling & Lake Erie on the division of costs, and applied a rule of his own.

There are many modifications of these rules. You could find variations in the application of these rules for almost every case that is tried. The factors referred to and enumerated are given varying weights by the different experts in the separation of common ex-

penses between passenger and freight.

purpose of illustrating the point.

One expert gives principal weight to certain of these factors, and another gives principal weight to certain others; the different experts, in separating passenger and freight expenses, will give varying weight in applying these various factors; one will use car mileage as his principal factor, and another train mileage, and so on, through the list. The various methods of the various experts applied to the same property would bring very divergent results. I have investigated to determine the range of difference in the results.

I have taken the total operating expenses of plaintiff, and applied the percentages for these various principles that I enumerated, for the purpose of illustrating how divergent would be the results 900 of these various principles, when applied. I have applied it to the whole, instead of the common expenses, for the purposes of illustration, and the divergence of opinion, as to what constitutes a common expense, seemed to justify that method for the

Rule.	Passenger	assignment.	Freight assig	nment.
Kuie.	Amount.	%.	Amount.	%.
Car mileage	\$289,698	14.5	\$1,708,216	85.5
Ratio of direct charges		22.7	1,544,388	77.3
Dollar of revenue method	525,441	26.3	1,472,473	73.7
Combination of revenue and				
locomotive car miles	607,366	30.4	1,390,584	69.6
Revenue basis		32.9	1,340,600	67.1
Locomotive mileage		46.3	1,072,880	53.7
Revenue train mileage		47.8	1,043,011	52.2

The expenses taken for this illustration are for 1912, for Michigan; the various rules applying to the total expenses would lead to

the above assignments.

I find that some experts vary the revenue train mileage basis by the inclusion of switching mileage. Certain of the items, with some experts, are divided on the basis of the revenue train mileage plus the switching mileage. The mileage of switching locomotives is not a measured mileage, but a mileage of six miles per hour. I have found no expert who uses one of these factors straight, without combination with others, to make his divisions. Mr. Peabody, who takes train mileage as his principal factor, does that more nearly than any other expert I know of, but makes variations.

It is possible for the expert, by giving greater weight to a certain factor and less weight to a certain other factor, to increase or decrease, materially, the common expenses which would be assigned to a particular department, as to passenger or freight. The variations

in assignments, in the cases which I have examined, I would 901 regard as surprisingly large. The range of variation in application of different methods to the operating expenses, or a block of the operating expenses, of the railroads of the United States has been shown by certain exhibits prepared by Mr. Muller in the Western Freight Rates inquiry. He applies seven methods; those methods are, as named by him:

Name.	Method.	Remarks.
James Peabody and Frank Nay.	Train miles.	
John G. Drew.	Revenue service locomo- tive miles.	
F. J. Moser.	Locomotive miles.	All switching assigned to freight.
Frank Nay.	66-2/3% on revenue, 33- $1/3%$ on train miles.	
C. E. Schriber.	20% revenue train miles and switching 80% freight and passenger gross earnings.	He suggests that one is adjusted to wear and the other to weather.
Frank Nay, D. A. Worthington and C. W. Hillman.	50% train miles, 50% car miles.	
J. P. Muller.	50% locomotive miles in- cluding switching in	

Those methods were applied to maintenance of way and structures expenses for 1910 for all the railroads of the United States, being a total of \$368,394,260. The greatest variation between the different methods is \$74,981,384, passenger. That is between the James Peabody and Frank Nay train mile method and the J. P. Muller method, the former giving to passenger \$171,321,530, whereas the other

freight, 50% car miles.

method gives \$96,340,146. In the freight, the highest is the Muller method, which gives \$272,054,114, while the lowest method gives to freight \$197,072,730. The method that is highest in assignments to freight is lowest in assignments to passenger, and vice versa.

Following is a table, by Mr. Muller, showing the results of allocation of \$368,394,260 of maintenance of way and structures expenses

for all railroads in the United States for the year ending June 30, 1910, by different methods named, with greatest variation:

Name of accountant and method	Freight.	Passenger.
James Peabody & Frank Nay: Train Miles	\$197,072,730	\$171,321,530
J. G. Drew:		
Rev. Service Loco. Miles	205,630,234	162,764,026
F. J. Moser:		
Loco. Miles. All Swtg. to Freight.	236,955,019	131,439,241
Frank Nay:		
A 66% Rev. B 33% Train miles	242,183,958	126,210,302
C. E. Schreiber:		
A 20% Wear-Rev. Train-miles plus Swtg. miles 95-5 B 80% Weather Freight & Pass. Gross Earnings.	257,500,080	110,894,180
Frank Nay, B. A. Worthington & C. W. Millman:		
A 50% Train-miles B 50% Carmiles	257,572,222	110,822,038
J. P. Muller:		
A 50% Loco. Miles incl. Swtg. F. 84.6-P. 15.4 B 50% Car-miles.	272,054,114	96,340,146
Greatest Variation	\$74,981,384	\$74,981,384

I have applied certain of these various methods to the accounts of a single railroad, to indicate the variation in application of the different methods. I have here the Atchison, Topeka & Santa Fe for 903 the month of January, 1910. I took the maintenance of way and structures expenses, and the methods I applied there were the post office department rule, the method used by Mr. Nay in the Advance Rate Cases, the method used by Mr. Drew, and the method used by Mr. Muller in the Pittsburgh Coal Rate Case; I have included, also, the old I. C. C. method used prior to 1894, and the method used by Mr. Peabody, who is statistician to the Atchison, Topeka & Santa Fe. The total of this block of expenses is \$1,567-,985.96. By the post office method, there is assigned to freight \$1,032,079.55 and to passenger \$535,906.41, being 65.82% to freight and 34.18% to passenger.

The application of the Nay method gives to freight service \$831,-659.77 and to passenger \$736,326.19, being 53.04% to freight and 46.96% to passenger.

The Drew method results in the assignment of \$921,034.97 to the freight service and \$646,950.99 to the passenger service, being 58.74%

to freight and 41.26% to passenger.

The Muller method results in the assignment of \$1,102,930.25 to freight and \$465,055.71 to passenger, being 70.34% to freight and 29.66% to passenger.

The old I. C. C. method results in the assignment of \$847,924.60

to freight and \$720,061,36 to passenger, being 54.07% to freight and

45.93% to passenger.

Mr. Peabody's method results in the assignment of \$847,924.60 to freight and \$720,061.36 to passenger, being 54.07% to freight and

45.93% to passenger.

The greatest variation is indicated by a comparison of the 904 Muller and Nay methods. I have applied different methods to parts of the South Shore expenses, using operating expenses as reported to the Michigan Railroad Commission. I made use of nine different methods, taking accounts 4, Rails, 25, Locomotive Repairs, 9 Bridges, Trestles and Culverts, 24, Superintendence, Maintenance and Equipment, 55, Advertising, and 82, Fuel for Road Locomotives. I found that the highest and lowest differences resulted in these variations, expressed in percentages, for rails, 72%, locomotive repairs, 111%, bridges, trestles and culverts, 154%, superintendence, 143%, advertising, 26%, and for fuel for road locomotives, 4%. centage is the percentage of difference between the highest and the lowest, or the per cent which, multiplied into the lowest and added to it, would produce the highest amount.

The methods I used in arriving at those percentages are the post office method, the Drew method, the Frank Nay method, the Worthington method in the Wheeling & Lake Erie Coal Case, the Peabody method, the Chicago, St. Paul, Minneapolis rate case method, the Virginia coal case method, and the Muller method in the Pittsburgh case; and I also put into this computation the Woodlock method, which is a method of Mr. Woodlock, the writer for the Wall

St. News.

The Muller produces the highest assignment to freight. total of \$15,112, the assignments to passenger were: Post office and Woodlock, \$6,875, Drew, Nay, Worthington and Peabody, \$5,576, and Muller, \$3,992; the sixth and seventh methods fall in between.

The conclusion I arrived at from the study of these methods is that they are reliable or not reliable, according to the judgment of the man that makes them. You do not get beyond, by the so-called sta-

tistical methods, the judgment of the man.

One expert may think it right to take in train weights in 905 determining the wear upon rail, and another may not; their results are no more trustworthy for a rate case, or for any conclusion, than the judgment of the man who applies the rules. If two experts applied the same rule, in the same way, they would reach the same result, but their judgment comes in in determining what modification of these fundamental principles they make in the rule that they

select.

So far as I know, judgments have not agreed on any particular factor. If they had, there wouldn't be this great variation in results. I think the method is pernicious; I wouldn't have anything to do with it, except to criticize it. There are so many arbitrary elements in the application of this rule that when one comes to a conclusion he hasn't anything he can rely upon. It seems to me to be an apparent demonstration by the use of figures which, when analyzed, is no demonstration at all, and simply a way by means of which men express their judgments. You might just as well take the judgments in the first place, without going through all of this analysis.

The Master: Isn't this a method of reaching their judgments?

A. I don't even regard it as that, because the questionable items

in it are so numerous.

In using the word "pernicious," I used it in a sense that any illogical argument is pernicious leading to an untrustworthy result. My idea is that the results of the application of these methods of separation of common expenses, if untrustworthy, in my judgment, they cannot be separated with any degree of accuracy as to warrant their use in determining a rate case.

In condemning these assignments and these rules for assignments,
I do not condemn them for the use of the railroad itself; Y

906 condemn them as used by the courts in determining rate cases

They may be very useful for the operating officer, for comparisons or for testing expenses, and I made that modification so that I wouldn't be understood as saying that these rules are absolutely useless for all purposes. They are approximately reliable for the use of operating officers, for the reason that in the case of comparative use of statistics you can have mistakes in your rules, but, if your mistake is uniform from year to year, the result may be of advantage to the operating officer in testing the relative economies of various divisions, or testing the operating results from year to year.

In a rate case, it seems to me you must have things that are accurate, but, for comparative use as statistics, it is not necessary to attain that degree of accuracy. I consider they are not available in rate cases, because they are not accurate, and because they require, in arriving at conclusions and applying rules, such an extensive use of arbitraries and judgments. I think any arbitrary; if it is an arbitrary of the nature of a judgment, ought to be excluded in what is

called a computation and a demonstration.

ADAMS.

Cross-examination.

By Mr. Butler:

I am not now connected with the I. C. C. I am aware that it is now considering, with the Association of Railway Accountants, the establishing of rules for the division of costs between freight and

passenger. That matter is now receiving attention, in that the I. C. C. has made orders requiring information to enlighten it on that subject, to the extent, as I understand it, that it has requested from the carriers a statement for the separation, so far as the separa-

tion can be made, and the rules they would adopt where they do make separation. They now have under active consideration the re-establishment of a direction for division of

these costs between freight and passenger.

907

Certain circulars have been issued under the direction of Commissioner Meyer, and over his signature, asking for certain information. I know, also, that Commissioner Meyer is committed to this theory of specific cost for specific service. I do not know that any other Commissioner is committed to it. I know that it is the policy of the I. C. C. to let each Commissioner develop his department very much as he sees hit, and, in my judgment, it would be an erroneous conclusion to say that the I. C. C. has reversed or intends to reverse its policy with regard to the assignments of expenses between passenger and freight.

I- what I have said, I intended to distinguish between the official acts of Commissioner Meyer and the Commission itself. This matter would be a subject of statistics. The work of the Commission is done largely by divisions. In the ordinary and usual routine of business, for the preparation of such an order as required the separation of costs between freight and passenger, or details of the work, itssupporting foundation, and all that, would be prepared in the division of which Commissioner Meyer is the head. If they approve the recommendation of the head of the division, an order on the sub-

ject would be made, if he recommended it.

I would not care to forecast the position of any other Commissioner on the subject. I do not intend to give the impression that this subject is not being considered in the ordinary and usual way that the making of orders on such subjects is considered. It is being considered. A great many things are considered that are

never consum-ated. The order in force for this division prior 908 to 1893 or 1894 was in effect when I took my position, in The Commission was created in 1887, and before the end of the next year they adopted this rule, from the reports which had been made and were being made to the State Commissions, and which remained in force to 1894.

Q. That is to say, in the reports that the carriers were making to the State Commissions prior to 1888, as you understand the fact to be, the common expenses—the non-allocable expenses—between the freight and passenger departments were customarily, and as a general rule, the country over, divided on the basis of revenue train miles, and that, when the I. C. C. came in, they found that established unit and adopted it, which you found when you came to the Commission?

A. Yes sir, in the first report of the I. C. C., it said that so far as reports were concerned it desired to begin with the reports that

I have not at any time, in connection with my official work, un-

dertaken to lay down any rule, or prescribe any method, for ascertaining the cost of doing freight or passenger business, or any part of either. I have made study of that question, with the view of ascertaining with approximate exactness the cost of doing freight or passenger business, or parts of either. I commenced that study in 1888; I studied it for four years, and agreed very heartily with the abandonment of the attempt to make that separation.

I agree, perfectly, with the recommendation of abandonment, and was a member of the committee that recommended it. So far as the resolution, part of which has been read into the record, is concerned, I concur in it, and I signed that report, and I suppose

that is an assertion that the thing is useless. I believe that all efforts to ascertain the cost of doing the freight of the passenger business on a railroad system is useless, for any public purpose, for any rate or tax question, except that it is useful for making operating comparisons. I don't think the thing is sufficiently accurate so that it can be relied upon for use beyond statistical and comparative purposes.

I think I am versed in, and an authority on, the subject of accounting, and especially as to railroad accounts. My testimony was confined to rate making; that was the purpose of submitting

these variations and these inconsistencies.

Q. The idea was to show the ramifications or variations possible to support your conclusion that, here, now, if the ascertainment of cost is necessary we are up against the impossible thing, was it now?

A. Yes sir. And that is my belief.
Q. And you further believe, do you not, that it is beyond the possibility of scientific accounting, or accounting upon sound principles, to ascertain the cost of doing passenger business on the D. S. S. & A., either as a system, or in Michigan, or the intrastate or interstate passenger business in either Michigan or Wisconsin?

A. Yes sir.

Q. And you believe, do you not, that, as far as the art of accounting is concerned, it would be utterly impossible for public authority to prescribe, or railroad companies to invent, any scheme of keeping the books of the carriers to show the cost of doing the intrastate freight business on any road, in any part of the country?

A. I do not think it lies in the ability of accounts to accomplish

that result.

Q. Or the total freight business of any road in any State?

910 A. I think so.

Q. Or the total freight business of any system of rail-

roads? A. Yes sir.

Q. And you would say the same as to passengers?

A. Yes sir.

Q. I want to make this thing complete; your idea is that the truth cannot even be approximated with reasonable nearness?

A. For a demonstration, yes sir.

Q. I mean for telling whether a rate is yielding anything above its cost—the cost of doing the service covered by it?

A. I think that lies beyond the ability of accounts.

Q. You think that lies beyond the ability of accounts to ascertain whether or not passenger rates on D. S. S. & A. in Michigan are sufficient to pay the expense of carrying that service?

A. I do. I think the methods of arriving at reasonable rates, resting on the specific cost of specific service, are methods which do

not lead to trustworthy results.

Q. I am now trying to confine myself to the question of ascertaining the cost of a class of business; you think it couldn't be ascertained whether or not three-cent passenger fare in effect on the intrastate business in Michigan paid the cost of doing the business, do you not; you can't get even that close to it, can you?

A. It is, of course, possible to make your maximums and your minimums so ridiculously high and ridiculously low that you can

be pretty sure you are in between, somewhere.

I do not think you can get near enough to state whether one cent a mile is too low, or three cents is enough. You can approximate anything, if you rely upon your arbitraries, but I don't think you can approximate the cost with sufficient exactness.

would be willing to say that ten cents paid the cost, and that nothing didn't pay the cost. I think it could be approximated more nearly than that, but not near enough to satisfy the rules of specific cost for specific service. I think you have got to have it

exact if you are going to demonstrate confiscation.

I have never worked out to see where I would let my judgment rest, but, if I must answer that, your Honor, I will say four cents up, nothing down. I got the minimum so low, as I wanted to be sure. I have never been a railroad operating man, and never occupied any position where I controlled railroad operating expenses, either passenger or freight. I never, in railroad employ, occupied any position where I was required to form a judgment as to the cost of business in the discharge of my duties.

Q. You do know, of course, certain truths that are generally recognized as about right, as, for example, that there are certain expenses that can be said, with truth, to be passenger expenses and certain other expenses that can be said, with truth and certainty, to be freight expenses; you recognize that as a truth of the railroad

profession?

A. No sir.

Q. You don't believe that?

A. No sir.

Q. You don't believe that the coal that pulls the suburban train that we are looking out at, here, on this lake front in Chicago, from here up to Jackson Park, is an item of passenger expense?

A. I think it may be.

Q. Coal costs money, and you ascertain what it costs; so you do know that to run that train it costs so much for coal, don't

A. Yes, I know that it is possible to weigh out the coal to 912 the passenger engines and to the freight engines, and that, if you are willing to rest satisfied with that as an allocation of expense to passenger service and freight service, you can do through accounts. Q. Now, of course, your point is that the passenger conductor would, ordinarily, be considered a passenger expense, wouldn't be; also the engineer, fireman, crew, and ticket seller?

A. Yes.

Q. Now, of course, you can say that the coal in a freight engine, that is weighed out to the freight engine, and hauls the train down to Newberry, sidetracks there for a passenger train to go by, and something delays the passenger train up the road, it stays there, burning coal for two hours, you do know with perfect certainty that the coal that freight engine is burning on the sidetrack as Newberry is a passenger item, and not a freight item at all?

A. The recognition of that and a great many other interchangeable items is the reason why I say that even those so-called direct

expenses are not always direct.

Q. That is the reason you say nothing can be allocated?

A. That is the reason I say practically nothing can be allocated. Ithink it would be justifiable, as an accountant, if the rest of the rule could be applied, to take the direct charges on the basis of vouchers; I would be willing to allow that.

Q. That is to say, you think that, where the allocations are made as a matter of current bookkeeping, and well done, they are sufficiently accurate for the purpose even of a rate case, as far as the

allocations go?

A. Yes, I think it would — reasonable to accept that.

The rules I have referred to pertain to common expenses. It is admitted there are certain other charges which do not take into account the fine distinctions we have discussed. Practical railroad accountants consider that not more than 20% of accounts can be located from the vouchers between passenger and freight. To allocate 60% to 70%, they use arbitraries, and they are using arbitraries and assignments in what they call tried accounts; these arbitraries are not negligible.

In my judgment, not more than 20% of the operating expenses, on the average, could be allocated definitely and certainly, with sufficient approximation to use in a rate case, where you want to find the cost. That would be found in locomotive repairs and car repairs and coal. From the pay rolls, you can assign the wages, except where there is a single employee doing both freight and passenger business, and where there is an express agent and telegraph

agent; there are a few of those accounts.

I am aware that accountants for the States in all these state cases, which have resisted railroad suits to declare rates confiscatory, have allocated or claimed to have allocated 60% to 70% of the total. 60% is a per cent that has come in very recent years; for years, the highest per cent claimed by those who discussed this question was 40%, and, if you analyze that 60%, you will find that there are a large number of arbitraries in it. Therefore, I am sure that whatever they call a direct cost covers things that are not direct costs.

I am aware that many railroads are still keeping separately, by systems and states, the freight and passenger cost, as a current matter, from day to day, on their books; they have to, to be prepared for

anything that comes; also, many use the figures for their operating control. My impression is that a much smaller 914 number of the railroads divide this by states than by operating sections; indeed, I don't know of any road now that currently keeps the divisions by states. I do not know of any that does not keep the division by states. Very frequently, the accounting division corresponds with the operating division of a railroad. I know what the general rules of carriers are as to dividing the common expenses between passenger and freight, as a matter of detail on their books. In the Atchison, for example, those are published; it comes out practically with the old I. C. C. rule, that modification being for the nonallocable items, and most extensive use of revenue train miles.

Q. This is what I am leading to: Isn't the fact that the revenue train mile, or substantially that basis, is in common and general use, and has been for a quarter of a century, by the railroads of this country for making that division for their own purposes on their

own books, as a current matter?

A. Yes sir, I am inclined to think that is true, but that purpose is the operating purpose, and the purpose for executing their interdivisional contracts, as, for example, on a locomotive pool or a car equipment pool, they make use of very many rules and arbitraries, which are mentioned in their contracts, so as to get the proper burden of expense to the various divisions of their property.

When they come into rate cases, they make variations of those rules, as has been shown by the rules that I have referred to this afternoon. I am under the impression that in the Oklahoma case the Rock Island modified its rule. I cannot specify any other in-

stance, as I never looked that up.

The revenue engine mile and revenue train mile produce very close to the same percentage, but not the same. Used by itself, the car mile basis for division of common expenses between pas-915 senger and freight I think absurd; used by itself, it is unsatis-

factory.

Q. And direct charges, you think, is another humbug, don't you?

A. Along with the other humbugs, yes sir.

Q. Don't you want to kind of specially emphasize that direct charges business; isn't that in principle? Here are certain expenses of factory; some can be charged to one thing and some to another, and then there are common, and then isn't it the mightiest humbug on the face of the earth to divide the common on the relation of the allocated, as a principle for general application.

A. I am not acquainted with all the humbugs on earth; I think it

is a humbug.

Q. Pure and simple, don't you?

A. I think it is an unfortunate rule.

Q. You don't think it is supported by any reason at all, do you? A. I would say "no" to that, if my answer did not imply that I did support some other. I don't think the allocation by direct charges is a sound rule for allocation, primarily for two reasons, one

being because there is a question as to what are direct charges, and the other being because you may assign an expense on the percentage of another expense and there is no relation between those two ex-

penses.

I took the total operating expenses for different items, to illustrate the large divergences that come from the application of those principles, and so as to make clear that the actual method used, which is made up by selecting from these principles, must rest upon

the judgment of the man. The showing would be more striking to take the totals, but the percentages would be the same.

The table on page 182 of my affidavit was designed to show, by primary accounts, the difference in the various methods. In making that table, I used, I think, nine methods, and on that one account six of the nine produced the same results. The percentages would not be the same throughout, because in other accounts they may have used other combinations. I selected the six accounts arbitrarily, and applied the different methods to each account. In account No. 4, Drew, Nay, Worthington and Peabody all followed the same method.

Q. Prof. Adams, in your affidavit filed in this case, I find the fol-

lowing language, and it begins on page 180:

"Q. What have you to say of the allocation of expenses as between Michigan and the other states through which the D. S. S. & A. R. R.

operates?

A. This is a very large question. I was for three years a member of a committee representing the state railway commissioners and the railway accounting officers of the country, appointed for the purpose of devising rules for the assignment of operating revenues and operating expenses by State lines. So far as I remember, the only resolution which received unanimous approval was the resolution which in effect dissolved the committee. It is easy enough to get a rule which seems all right on the face of it so far as the localization of either revenues or expenses is concerned; but when one puts these rules together and applies them for the purpose of discovering the net operating revenues by states, the limitations of the rules which before had appeared so plausible, become evident. The unsatisfactory character of rules of this sort is that items respecting which some degree of judgment must be exercised are so numerous as to cast doubt upon any result which rests upon them. I might also say that from my study of this general question, I should hesitate to approve Mr. Delf's statement that ninety per cent. of operating expenses could be allocated directly as between the States. If this be correct it must be due to the unusually simple conditions under which the D. S. S. & A. R. R. operates.

Q. What have you to say of the separation of operating expenses

between the passenger business and the freight business?

A. This is an old question. In 1893 the Interstate Commerce Commission abandoned the attempt to secure from carriers this class of information, on the ground that it could not be given with sufficient

accuracy to serve any practical need in the testing of reasonable rates. I have kept in touch with the various phases of this question since 1893 because of my interest in the rate cases that have been put up from time to time to courts and commissions, and that which impresses me the most in this matter is the

great variety of rules that have been named for the separation of passenger and freight expenses. These rules are not always consistent, either in the principles upon which they rely for the separation of common expenses, or in the relative emphasis which they place on

the common principles recognized.

In order to indicate the wide range of results which follow the application of these various rules the following statement is submitted, designed to indicate the differences which show themselves in the application of various well recognized rules to certain of the primary accounts of the D. S. S. & A. R. R. To be exact I have tested this matter by applying nine rules which are advocated by different experts and which have been used in different cases, to the operating expenses as reported to the Michigan Railway Commission. The percentages in the statement indicate the difference between the highest and the lowest amount assigned to the passenger service of the total amount of expenses charged to the account named. the purpose of this statement is to illustrate the point submitted above, I have not gone beyond the application of these rules to six primary accounts."

Then follows a tabulated statement, the caption of which is "Statement," and there is a column at the right, the caption of which is "Difference between lowest and highest assignments." The items

in that statement are as follows:

in that statement are as follows:	7901
Account 4, Rails	1110
Account 4, Rails Account 25, Locomotive Repairs Account 25, Locomotive Repairs	111/0
Account 25, Locomotive Repairs Account 9, Bridges, Trestles and Culverts	104%
Account 55, Advertising	4%
Account 62, Fuel 161 1600	

"The possible range for estimates and arbitraries is too broad to warrant any considerable degree of confidence in the results arrived at."

Does the language in this affidavit to which I have just called your attention fairly state your present views upon the subjects?

A. Yes sir.

Q. Now, yesterday you gave me the impression that you thought that any attempt to divide operating expenses between freight and passenger was utterly useless, or worse, in so far as the results would have any value for the purpose of making a 918

rate or testing the validity of a rate in dipute? A. Yes sir. That conclusion is grounded upon the reason that sufficiently accurate results cannot be obtained. I do not think cost of specific service should have anything to do with the specific rate covering that service, primarily because it is adopting a rule which is incapable of being worked out with satisfaction; also, the reason that transportation is a unit—a service rendered by a large number of agencies.

It is my view that the aggregate operating expenses ought to be taken into account in making a schedule of rates which will yield the aggregate revenue; this it is possible to secure from the records, while it is not possible to obtain the specific cost for specific services, in my judgment. Even if the specific cost could be determined, I should be disinclined to accept the rule of specific cost for specific services, because it would seem to me to prevent the railways adjusting their rates so as to render the highest possible service to the public. It would harm the railroads by checking the development

of the country, if they were now put into force.

My refusal to accept the rule of specific cost would apply to the intrastate business, taken as a whole, in any state, as compared with the interstate business, taken as a whole, in the same state. My judgment is that the cost of doing the entire intrastate business is not obtainable with reasonable accuracy for use in making intrastate rates. If it was, it should not be the test of reasonableness of either intrastate or interstate freight or passenger schedules taken as as a whole. If the rule is to ascertain the specific cost of the intrastate business as against the interstate business, each being taken as a whole, in any state, then it is my judgment that all

919 effort to ascertain such cost would be futile, as far as rate making is concerned. In my judgment, the application of the rule would be pernicious and harmful to the country and the

railroads.

Q. Take the passenger business of any carrier, as a whole, as compared with its freight business, as a whole, I understand you are of the opinion that the cost of either cannot be ascertained with any reasonable degree of approximation, and that an attempt to do so

would be futile?

A. That is my opinion, yes sir, futile for the purpose of rate making. The making of rates on that basis, even if the cost of freight and passenger could be ascertained, would be pernicious and injurious to the country, the carriers and the public, in my judgment. I think that under certain conditions it may be good business, reasonable and beneficial to both parties, for the rate making authority to be permitted to make the freight or passenger rate so low that some part of the expense of one would have to be borne by the other class of business.

Rates ought to be permitted so that the shipper of one class of freight—e.g., first class—should be required to pay some part of the expense of hauling a lower class, like grain of the farmers to market, if the rate making power believed it sound policy to do so. The question of whether it is permitted under decisions of the court calls for a legal opinion, which I am not competent to make. I think the rate making power ought to be permitted to so make the rates that the shippers of freight would have to pay a part of the expense of passenger transportation, if in the opinion of the rate making power it was sound public policy to do so.

I think transportation is a unit, and the application of ordinary business priciples to all of these traffic questions is desirable.

920 The unit would be described by the system undertaking the service, and the property used by that system would be the physical expression of that unit. I think the rate making power should be permitted to discriminate between different classes of passengers, and ought to be permitted to require railway companies to

carry passengers free if, in the view of that power, it would be wise from the standpoint of all concerned and the public and the carriers The difficulties arising out of our forms of government must be overcome before you can have a properly organized body for the supervision of railway transportation.

I think any charge which under strict and proper accounting goes to the capital account of a railway or a public service industry is a charge to be included in the sum upon which the public service industry is permitted to secure, or ought to be permitted to secure, a

reasonable return.

The prices paid by the operating company is not in all cases, in my opinion, a satisfactory test, though it is where there are conditions of free sale, and no comity of interest between the partieswhat we ordinarily recognize as a free market. The price paid for a property 50 years ago would be the test now, provided the proper debit and credit charges to the capital account had been maintained to the proper account during those 50 years. It should be taken, provided it is taken in connection with all the accounting entries that properly record the transactions of the company during the 50 They would affect what I call the proper charges to the capital account, which is, as I have stated, the figure that should be taken to measure rates.

My views, as to the rule of a specific cost for specific services, are not affected by my views respecting a proper procedure for making

rates.

Take a purchase of real estate 50 years ago, at \$5,000, and 921 assuming the same real estate now used for the same purpose as it was used for 50 years ago, I think the \$5,000 is the sum that ought to be included in what is called the value for determining the rate. I do not mean, by value in its use there, what is called the fair present value as that term has been used by the Supreme Court of the United States in rate cases. I understand my answer is not in harmony with some of the views of the court.

The value for ad valorem taxation may be higher or lower than the value for rate making purposes, or it may be the same. comparison would not tend to shed any light on the propriety of the

tax or of the rate valuation.

For the purpose of what I have said, all of the material entering into the construction of a railroad is unlimited. The commercial value of a railroad is the value which arises upon its earning capacity, arrived at from the books. If you are given a true net revenue, then you would get at the commercial value by capitalization. take the net revenue, assume a reasonable percentage of return, capitalize that revenue to arrive at a capital fund which would produce that return, and that would be the commercial value of the property.

I have no personal judgment as to what is a reasonable rate of return, but I have always substituted for my judgment the judgment of the market, and that, after allowances for uncertainty of revenue,

would seem to me to be five or six per cent,

The commercial value might be greater or less than the physical value, arrived at by the reproduction method. My answer is that neither the commercial value nor the physical value as determined by inventory should be accepted as the basis for makin a rate; I make this to preclude my assent to the proposition that the physical valuation being made by engineers represents the value upon which return should be made. The commercial value should not be used as the basis for computing the return, or determining the reasonableness of a rate, as it is at issue in the case. It depends upon the rate; as you make the rate, you increase or decrease the commercial value. Therefore, you cannot take the issue in the case as the basis for computation.

In my opinion, the engineers have not, by the methods they have adopted thus far, so far as I am acquainted with them, arrived at the correct conclusions for the testing of rate cases. In my judgment, the engineering profession has been in error in the inclusion, in arriving at real estate values, of all their multipliers; also, the application of percentages for contingencies seems to me to have been

over-emphasized.

In my direct testimony, I did not intend to suggest any method to be used for the separation of operating expenses on South Shore between passenger and freight. I intended to criticize, as useless, the method which had been employed, or any other ever employed

or that could be devised.

The portion of my affidavit read this morning was for the purpose of sharply illustrating the different results that could be obtained by different methods, and for the purpose of establishing my claim that they are all wrong. I am not conscious of having selected the instances calculated to bring out in a glaring way the different results that could be reached by the different methods. I have never prepared anything that would do it in a more glaring way. I have never seen it illustrated more glaringly, though I think what was referred to as prepared by Mr. Muller would produce the same result more convincingly, because it covers larger figures.

923 I did not know that at the time I made the affidavit, but learned it since, and brought it in to more convincingly present the facts. I selected accounts 4, Rails, 25, Locomotive Repairs, 9, Bridges, Trestles and Culverts, 24, Superintendence of Maintenance of Equipment, 55, Advertising, and 82, Fuel for Road Locomotives, and applied to each item nine different methods. I distinguish between car mileage as a factor and the rule that makes

use of car mileage as a factor.

On the item of rails, \$15,112 was the system expenditure for 1910. The factor used by the post office department for rails was revenue train mileage; Drew's was revenue service locomotive mileage. I cannot give the miles used in making the calculation according to the Drew method. I think those came from the annual report to the I. C. C. or State Commission, and that is true of the revenue train mileage, that the post office department uses.

Nay used the revenue train mileage for rails. The Worthington method was one-half on train mile basis and one-half on car mile basis. Peabody uses the revenue train mileage, the same as the post office department. The Chicago, St. Paul and Minneapolis

case method was 90% on weight and 10% on earnings; that was worked out by J. r. Mutter. The Virginia Coal method was 90% train weights and 10% earnings. I have not the definite figures

for that account for those two methods.

The Virginia Coal case was the Hillman Virginia method. The various Hillman methods were taken from a brief of D. A. Worthington, receiver of the Wheeling & Lake Erie. The Ohio Lake Cargo method was 50% car mileage and 50% train revenue for account 4, Rails. Hillman's Florida method is all train weights; his South Dakota method is 90% train weights and 10% gross earnings on traffic, excluding switching, mail, etc. The Hillman,

924 Minnesota, Alabama, Hocking Valley and Norfolk & Western formulas were 90% train weights and 10% earnings (gross or net). The Hillman I. C. C. formula is 90% freight

revenue and 10% passenger revenue.

I approve of none of these for dividing the rails. I consider all the Hillman methods just referred to as valueless for the purpose of dividing the cost of renewal of rails between freight and passenger

departments.

That whole theory of assignments has had a historic development; it was used in Germany, where they used wheelage and where their cars were small, and they had some cars with four wheels, others with eight wheels, and then they began to use big cars, with more wheels, so they used wheelage as the basis, and others used axles as the basis. At one time in this country, when Mr. Albert Fink was chairman of the trunk line, he endeavored to have the railroads of this country adopt an axle basis. They did, however, continue their train mileage, on the theory that the wear of the rail was in proportion to the impact of the train, and that the heavier freight train was more than counterbalanced by the impact due to the speed of the passenger train. There was possibly some justification for that at the time that it was used. Then came the development of fast freights, of heavier freights, and the development, also, of the very heavy passenger trains, and it seemed to those who were dealing with this that the change in the method of traffic vitiated somewhat, or impaired somewhat, the application of this rule.

The old Interstate Commerce rule, and these various rules that have sprung up since that time and since the recent revival of this attempt to separate costs, I think, is responsible for all of these variations. Showing that the conditions of traffic are very much more complex than they used to be, and that the manifest errors, arising

from those simple rules, have led the experts to endeavor to 925 make allowance for specific conditions. I can illustrate that best, I think, by Mr. Muller's statement with regard to ties. In that case, he puts 17.5% assigned to wear allocated on the basis of train weight, and 82.5% assigned to weather allocated on the basis of earnings; that is, the ties, as I understand his reason, are subject to two causes of deterioration, one being the wear and the other the weather, and he assigns 17.5% to wear and 82.5% to weather. That I understand to be the way they get at these minor distinctions and modifications of the rules.

The Woodlock method is set forth in his book, "Anatomy of the Railway Accounts." I don't remember whether he used train miles. I think his result on rails was the same as the post office method—\$6,875 passenger; I don't know whether he used the same factors as that method. Muller, in Pittsburgh Coal Rate Case, divided rails one-half on locomotive miles, including switching, and half on car miles.

I have no opinion as to which of the nine methods most nearly approximates the truth. I have never formed an opinion as to the proper method of dividing rails, or any other item in the schedule, between passenger and freight. I have never been able to devise a proper or satisfactory method for any account. If they are all pernicious, I don't see how some of them could be better than others. I have testified that I think the system is wrong, or, at least, the conclusions erroneous, and I should not care to testify that some of them are absurd, as that calls upon my distinguishing between the methods.

The post office method has not been promulgated in the sense that it has been sanctioned by Congress. They have not used the method, except in the report of the Postmaster General to Congress,

and it has been made the subject of considerable study by all 926 the railroads of the United States. It has never been applied to any practical question for the purpose of getting at results, and I understand that it is at present before Congress. By the use of that method, I assigned the highest amount to passenger—\$6,875. The post office method varies very little from the method used in the Buhl Case by Commissioner Meyer. The Muller method

gives the lowest to passenger-\$3,992.

The post office and Woodlock methods assign 45% to passenger and 55% to freight, while the Muller method assigns 26% to passenger and 74% to freight. The difference between these two methods would be 19%, but I do not express it in that way. The percentages assigned to passenger by the different methods are: Post office and Woodlock, 45%, Drew, Nay, Worthington and Peabody, each 36%, and Muller, 26%. I have expressed the variation by a percentage of 72, and I expressed that difference in the words, "Difference between the highest and lowest assignments in percentage." The percentage of 72 was obtained by substracting the lowest assignment, \$3,992, from the highest, \$6,875, leaving \$2,888, divided by \$3,992 equals 72%; that is the difference between the highest and lowest in percentage, and the caption is accurate and truthful.

The 72% is the relation of the difference to the lowest, and the same result is varied if you take 45% minus 26% equals 19%, divided by 26% equals 72%. If you had divided the \$2,888 by the highest, \$6,875, the result would have been about 42%, but that is not the way that you find what the percentage of difference is. The 72% shows the variation in the result of the application of these rules. It shows that you must add to the lowest amount 72% of itself, in order to produce the highest, and therefore the difference

between them is 72%.

927 I think I have saved the figures working out these accounts for the nine methods, but I don't know. It is true, so far as the affidavit is concerned, that it is impossible to check the correctness of my calculations resulting in these percentages without those figures.

My memory is that all these methods were taken from the statements of the men by whose names they are identified—taken from their testimony in cases, as reported. I will identify these methods, and give the sources from which the data was taken, and sources of details of the Nay, Worthington, Peabody, Chicago, St. Paul & Minneapolis, Hillman, Woodlock and Muller methods.

I can furnish at a subsequent time the working figures by which I obtained the percentages in the column of difference between the lowest and highest assignments, which are in my affidavit, and also

a statement of the nine methods.

The method of giving the lowest amount for item 25, Steam Lo-comotives—Repairs, to passenger is the post office method; that method gave the highest amount to passenger in the division of rails, and the Muller method gave the highest for locomotive repairs and the lowest for rails, thus trading places. That is typical of the use

of these figures by the various experts.

I would have to get the data from the books of the company to apply the Drew method for account 82, Fuel for Road Locomotives. I did not go to plaintiff's books to find out those factors. The percentages in this statement and my affidavit may have been arrived at by taking the South Shore figures; they were percentages that I find in the work of others. Of course, to be exact in amounts, that would have been incorrect. Mr. Muller worked on a coal carrying road, and his passenger assignments seem to be a small percentage of

the total. In some instances, he was the low man, so far as 928 the passenger assignments on these six items of the South Shore primary account was concerned. Not having the South Shore data, I took the percentage which he ascertained in some other

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It is readily conceded that, if the amounts were significant, that would not have been the proper method of procedure. Inasmuch, however, as I was merely illustrating a general situation, and by differences, it occurred to me that the exact amounts were not neces-

sary for the conclusion we aimed to arrive at.

Q. But the same method for dividing the principal items in the maintenance account—take revenue train miles for example; applied in precisely the same manner, it would give widely different percentages on different roads, the traffic being different in its relation of the freight to the passenger; isn't that true?

A. That is certainly true.

Q. So that, for example, if you took the revenue train mileage basis for the purpose of apportioning the maintenance of way and structures common accounts between freight and passenger, on the Burlington road, in the vicinity of the coal mines in southern Illinois, where, over that particular division, we will say, there is ten times as many freight train miles performed as there are passenger

train miles, you would get a very low passenger allowance,—a ten per cent allowance on that figure,—wouldn't you?

A. It would be quite possible.

Q. But if you applied the very same rule to the very same problem on the New Haven road, or on another part of the Burlington, as, for example, between Chicago and Aurora, in Illinois, where there

is, say, for the purposes of my point, ten times as many pas-929 senger train miles performed as there are freight train miles, then you would get 90% of these items so divided to passenger, as against the 10% that you would get down on the coal mine divis-

ions, in southern Illinois; that is true, is it not?

A. All of those results follow from those assumptions.

Q. Now as a matter of scientific investigation, in searching after the truth, would you not say that the application of the percentages ascertained by Muller's scheme, on a coal carrying road in West Virginia, would be unfair if applied on the South Shore in Michigan, if the relation of the passenger train traffic to the freight train traffic is different to that on the road in Virginia, where Muller worked?

A. All of which I was endeavoring to illustrate by what I put in

my affidavit.

Q. Now, did you put anything in your affidavit to indicate that, in arriving at these percentages, you took percentages ascertained by investigators on other railroads, where conditions were probably different?

A. There is nothing there to indicate the percentages or the rules that were used, and all that you are saying seems to me to lie right

alongside-reinforce-my point.

Q. That is, you say that if on one railroad in a given set of traffic conditions a method of dividing these common operating costs in the maintenance account produces a low per cent and or another road, where there are the reverse conditions, it produces a high per cent to freight or passenger, that tends to discredit the method?

A. Yes sir, it shows that the conditions are so various that you must have a method for every set of conditions, and that that opens the way for arbitrary determination in particular cases, so that it is unsafe, as a general rule, to be followed in rate

cases.

I said it was possible, in case of direct charges, that, in reaching affidavit percentages, we used the percentages ascertained by the application of the method to conditions of other roads, but I never conceded that we took the percentage of locomotive mileage in a coal road and applied it to a passenger road. In the affidavit computation, I made no use of train weights. I applied the methods, but, where we didn't have the data for a particular account, that was left unfilled. I desire to check the figures given as details of percentages of the affidavit, and see if they are correct.

If on seven of the nine methods the results were alike and one different, I think the argument in the affidavit table would be weakened, but that is not the fact. On account 4, which is but one of 115 accounts, four of the methods agreed at 36% to passenger.

two at 45%, and one at 26%. These facts are important in a search for the truth. I do not know why all the figures for each of the six accounts were not put in. I do not know why I took these six accounts, rather than others. My memory is that I took them as they came, picked them up here and there, because each one involved a different set of considerations; but it is merely illustrative of the variation. It would have been much better, doubtless, if the entire 115 had been spread on the record.

I do not know whether other items would show greater variation; I am sure, from general study, that others would show just as great variation. With regard to South Shore, I never made that test, but I know that is typical of a general variation in the various accounts.

It is very much greater than the average of the total, because 931 one set of figures would be higher and another lower, and in the total it is possible that they many to some extent counteract each other; but the purpose of the argument is to show the un-

certainty of these arbitraries.

I selected the six items at random. The items selected are those which cover a common freight and passenger use. The wage items were not selected, as they are more largely subject to direct charges. I selected what seemed to me to illustrate the point that there were great variations in the different methods and that the divisions were open to question because of such enormous variations. The inclusion of account 82, showing a variation of 4%, shows that I did not select to show the most glaring instances possible.

My examination was made for the purpose of most strongly, by illustrating variations, supporting my long entertained contention that an attempt to make these divisions is futile, and worse than useless. The argument was presented in the strongest manner I could

think of at the time.

Q. The direct charges method is that, in the case where you have charged some items directly to each of these departments and there are some items yet to be divided, you ascertain the relation of the passenger direct charges to the total direct charges and assign to the passenger such proportion of the items to be divided as the direct passenger charges is to the total direct charges; is that it?

A. That is correct.

Q. Can it ever be applied to any item so as to show the truth or

the approximate truth, in your opinion?

A. In my opinion, it is very questionable, for the reason that it may lead to the division of the expenses of one class according to prinliples that dontrol the entirely different classes of expenses.

Q. By unrelated things?

A. Yes, you may use as the basis a ratio derived from a set of expenses that have nothing to do with the expenses you are

assigning.

Q. Suppose you were dividing the cost of lubricants on a locomotive, and you had directly charged out the fuel and water, but hadn't kept account of the oil directly as furnished to each class of locomo-

tives; then the direct charges basis would have some relation to the problem?

A. It might have some relation to the problem, provided you knew from the record the relation of oil total to the total of coal.

Q. That would be a simple matter of keeping the record?

A. In that case, it might not be questionable.

Q. So, when you are considering these factors, it is well to consider the whole problem, and not pick out any one particular thing, and show that it is absurd as to that, and jump to the conclusion that it must therefore be absurd as to the rest, isn't it?

A. That is correct.

I shouldn't undertake to say that these rules that we have been considering, known as the Nay rule, the Drew rule, and others, are not more accurate in their results than just the bare application of

the general principles.

I think, if the problem is that of the operating officers, that the locomotive mile can properly be used for some divisions of common expenses. No matter what the problem is, where you are trying to divide, between the two departments, certain items of cost, it can be used. I think the revenue train mile can also be used if you

933 used. I think the revenue train mile can also be used, if you are bent on doing it. I cannot think of anything better for the division of the cost of maintaining fences along the road.

I would not say it would produce right results.

The chief purpose of a right of way fence is to protect the train from trespassers, and to protect trespassers, whether live stock or persons and to distinguish railroad property from the other. If you are trying to get at the cost, I would say apportioning half the cost of repairing the fence to freight and half to passenger, where the number of trains is equal, would not be a proper basis. In a rate case, if you are endeavoring to base your argument for a reasonable rate on cost, that division would not be sufficiently accurate.

I can conveive of very many things that could damage that fence and call for repairs which might be wholly imputable to one service and not to the other; therefore, an assignment in proportion to train mileage would not give the proper results. Even if all the repairs were the to weather, I don't think a division on the train mileage basis reflects the exact truth. I do not see that weight and speed have anything to do with the wear of fences. I don't think there is any definite relation between the weather wear of the fence that causes a fence repair and the cost of running a freight train or a passenger train.

The cost of repairing an exclusive passenger platform would come under the head of direct charges; that would be accurate enough for rate purposes. In saying that that is sufficiently accurate for rate purposes, I mean the methods by which the figures are arrived at do not depend upon the exercise of arbitrary judgment

on the part of the accountant.

The rate problem is insoluble along the lines of the analysis of cost. Whether the judgment of men familiar with conditions affecting the relative cost of freight or passenger business is a safe criterion depends upon what the judgment is for. The

practical man is obliged to go through this same line of analysis that the experts go through with, and, if they are not tenable for the experts, they cannot be tenable for him. I don't object to the exercise of personal judgment for certain purposes, but what I object to is the adoption of a rule which requires such an extensive use of arbitraries and personal judgment, which assumes that it is a

demonstration, and accurate.

Even if you had the passenger expenses in Michigan correctly, it is not my opinion that the division of that between intrastate and interstate passenger in Michigan can be fairly and reasonably approximated. I think that division cannot be made with sufficient accuracy to justify the formation of an opinion as to the reasonableness of the interstate or intrastate rate; but you can proceed upon an entirely different analysis for a conclusion respecting the relative cost of the interstate and the intrastate. I don't think you can determine the relative cost of the two with any mathematical accuracy, but you can set boundaries beyond which it is not reasonable to say that it goes in either direction.

What I said in my affidavit was that 25% excess cost for intrastate business is too high; the 10% or 12% would be somewhere near right; it may be 5% or 6%, and it may be nothing. Confining yourself to that particular question, you can set a maximum and a minimum with, perhaps, a reasonable degree of certainty. That may also be so in the division of freight cost between intrastate and

935 interstate, if the operating conditions are such that indicate that there is a difference in cost. That is a matter of judgment of men familiar with it, who can get reasonably close to it. I have not set any figures; I simply put a maximum one

way and the other, and I say that it seems to me, knowing what the courts have said in other cases, that the 25% is too high.

I have not consented to the proposition that, if we have the right amount of passenger expenses in Michigan on the South Shore, the relation of the cost of intrastate to interstate can be gotten at as a matter of judgment with reasonably close approximation.

Q. What I said was that you can get a maximum up beyond which you are very sure it does not go, and a minimum below which it won't go, and this maxima and minima, as you intended to express it in this affidavit, 25% was probably too high and 10% or 12% about right?

A. Yes, and there are 10 or 12 ratios between that you can have;

your question implies that you can get at a ratio.

Q. You can get that close to it, anyway—from 15% to 25%?
A. Yes, where you have a range of 30% or 40%, I guess you can.

Q. You didn't have a range of 30% or 40% when you said 25% was high and 10% or 12% was about right, or something like that?

A. 25% high and 12% low; the difference is 108%.

You might estimate the freight within 30% or 40%, if you had the total freight expenses in Michigan. I don't know as you could get it as close in the freight as you can in the passenger.

Q. That there may be no misunderstanding, I want you to cal-

culate on the record that 30% or 40% spread that you say you had in the passenger business when you made your statement, in your affidavit, that I have red. I want you to work out that 30%

936 or 40%.

Tell us how to do it, and we will do it; tell us on the recor l. A. 25% is your maximum and 12% is your minimum; the difference is 13%, and the variation of the per cent is that per cent which multiplied into 12 will give you 25, which is over 100%; so

I withdraw 30% or 40%, and substitute 100%. The range of difference is 108-1/3%. That is the customary way of expressing ranges of per cent, when you wish to find out how much you must add to the lower figure in order to get the higher.

If you wish to proceed on the discount sile, you would divide the 13 by 25, but I do not understand that is the way to express ranges of percentage. To subtract the 12 from the 25 and say the difference was 13 would indicate the difference in quantity; that is not a difference in relation.

ADAMS.

Redirect examination.

By Mr. Wykes:

In my criticism of plaintiff's figures, I do not think I have gone further than to show the uncertainty of the method followed by plaintiff in the presentation of this case. It has been my understanding that in rate cases it is the duty of the railroad company, in attacking a rate, to show the confiscation to be palpably and certainly the result of the rates, before they have made out a case. In a case involving confiscation, the method ought to be definite in all its items.

I did not engage in constructive work, in assigning costs between passenger and freight, because I do not believe in that, and do not think results which are reliable can be attained in the assignment of common costs of railway operating. I have, in connection with this case, declined to consider constructive work in the assignment of costs.

I was asked to do so, and I refused.

Q. In your criticism of so many arbitraries which rest in 937 your judgment, is that criticism to any extent due to the fact that these arbitraries are dependent upon and have been reflected in different judgment, very widely varying, with no seeming common consensus of opinion upon them?

A. I have been impressed strongly that that was the fact in study-

ing these varying methods.

The percentages expressed in my affidavit show the differences between the highest and lowest assignments that would result from the seven or nine methods which I applied on certain primary accounts. I don't know that the table in the affidavit presents the question more strongly than the figures would if applied to certain other items of the primary accounts. I have never attempted to prove that out, and didn't work out a number of items and then take the highest.

The fact that by different methods applied to a certain account the

same results are produced for a single item is no indication whatever that the results as applied to another of the 115 primary accounts would be the same, because of the fact that these methods may have been quite alike on account 4 and different on other accounts; there may be a variation, and that variation may be up or down.

For a particular item, one man's method would produce a high figure in one account and another's a low figure, and on another ac-

count those same methods would perhaps produce the reverse.

It seems very easy to devise rules to localize the expenses by states, and that has been done, and tentative rules for that have been published, but, when you add to that a separation of revenues by

states, so as to give to each state its proper proportion of net 938 revenue from operations, it is found to be a very difficult question, largely because certain states have the terminals and other states don't have the terminals; the difficulty arises on account of the proper allocations of the terminal revenue and expense. It is the same class of questions that comes up in the allocation of expenses or revenues between branch lines and main lines, between

feeders and trunk lines.

It is not necessary to arrive at the physical value in order to determine the commercial value. You can reach the commercial value by a capitalization of the net earnings at a proper rate. Definite and formal interest by the I. C. C. in the re-establishment of a rule of assignment of costs has been shown since Mr. Meyer of Wisconsin became a commissioner, about three year ago. The formal action on this point has been taken since he became statistician, after I severed my connection with the Commission, in June, 1911.

ADAMS.

Recross-examination.

By Mr. Butler:

It is my understanding of the rule in confiscation cases that the proof and methods of proof, as respects the ascertainment of costs, must be definite and accurate. My position is that there are no definite or accurate methods of ascertaining the cost of doing business covered by the rates complained of.

I do not think it is necessary to determine the cost of doing the passenger business on any road in order to determine confiscation. I think the total cost of all business, state and interstate, would have

to be determined. I am familiar with the decision of the Supreme Court to the contrary, and think that will have 939 to be modified before we get any satisfactory adjustment of

this problem.

I think a railroad properly administered might evade the necessity of having a rate case tried on the confiscation basis; it might do that by turning from the expense side of its accounts and statistics to the revenue side and service side and traffic side of accounts and statistics. That question opens up a whole question of public policy, and then asks whether the railroads are willing to take their side of that work, and whether they will or will not, if they take that side of a public policy work and recognize frankly and freely that they are public agencies, be met by the public so that there can be some harmony of action.

I said several times that I do not think this method can arrive at sufficient certainty so that you can demonstrate confiscation or the absence of confiscation. I don't think any method that applies the

rule of specific cost to specific service can do it.

Q. Can any method do it, at all? Is there any way to do it, and,

if so, how, in your opinion?

A. I can possibly answer that to the extent that the question of confiscation is decided, or ought to be decided, when the total expenses are measured against the total revenue, and the relation of the total net revenues considered, and that net revenue considered in its relation to the value of the property. Now, if it is shown that there is no confiscation, then the question of the distribution of the burden that the public contributes—passenger and freight rates—to the company is a question of public policy, and not a question of

private corporate management.

940 I do not distinguish between states or between intrastate and interstate revenue in my answer. I do not think there is any way to ascertain that with sufficient certainty or definiteness to meet the requirements of a confiscation case on intrastate net earnings, both freight and passenger, taken together, in any state, nor to meet

the requirements of making a reasonable rate.

I think the ascertainment of the net earnings by totals for states is the easiest of all the questions of separation, and, if that were the only point to be considered, it is possible that one's judgment might approve a rule for the separation of expenses and revenues by state lines. My answer, in answering your theoretical question as to confiscation, was confined to the total revenues of the railroad as a unit, because, in that case, no question can arise as to what is the expense or what is the revenue. My idea is that they could make them haul certain classes of business for nothing, as long as the total on the system was sufficient, if there was a reason for justifying this, and that, also, discriminations between classes of traffic might be made, so long as the total revenue was all right and the discrimination reasonable in the judgment of the rate making body.

I declined to serve the State in the capacity of an expert employed to determine whether or not the intrastate rate was confiscatory. I accepted employment on criticizing the methods that were, or might be, adopted, for the purpose of showing that the case is not made out. My assistants, of whom there were six, reported to me that they were treated very courteously, in being given access to company records. I have no complaint that every facility was not offered us to ascertain the exact, specific, concrete facts in the case, the manner of keeping records, etc. I have given in testimony all that I desire in the way

of criticism, and my criticism is not directed to the accountant of the South Shore, but to the general principle.

I think all the methods for the separation of costs are bad, and I should dislike to say that one is better than the others. From

the first, I declined to take up the question of whether the rates were confiscatory, and decided to confine myself entirely to the criticism made. The work done by Messrs. Friday, Heiss and others was not all done in aid of criticism. There were questions with regard to the localization of revenues and with regard to methods of apportionment, and to many other questions which were taken up. There was nothing constructive in my work, so far as determining whether that particular rate was or was not confiscatory, except so far as contained in this first affidavit. All of the work done under my direction was

for the purpose of testing the work.

With regard to the item of wages of switch engineer and fireman, if observation shows they spent nine times as much time in the freight as in the passenger business, and the item divided 10% and 90%, that would be an arbitrary allocation upon the basis of time, the arbitrary being the assumption that the time reported is the time in one service and not in the other. I would be willing to call the wages of the engineer a direct expense, if it is on the basis of time. I would be willing to go that far; that is an arbitrary, upon the basis of time, which you could approve. The whole question of its propriety depends on the facts on which they rest. If the facts justify it, it is a good method. Whatever the facts justify is doubtless a good method; there is no denying that.

Walter J. Myers is the statistician of the L. C. C. and under the immediate direction of Commissioner Meyer, who initiated the move-

ment to make the division of operating expenses between passenger and freight which commenced soon after he became a member of the Commission. Mr. Walter J. Meyers is obeying orders, in trying to find a basis for that division to recommend to Commissioner Meyer, so Meyer may recommend it to the Commission, so the Commission may make an order, if it sees fit. I believe it to be contrary to the fact that Walter J. Meyer believes in the assignment. I think he is obeying orders, but I think he has little confidence in the assignment of expenses between the passenger service and the freight service.

I have spent no time investigating the subject with a view to opposing the order; I have done nothing in connection therewith, and am not concerned in it in any way. I have had nothing to do with the I. C. C. since severing my connection with it, except to appear as a witness before the Commerce Court. I have nothing either for or against the policy advocated by Commissioner Meyer that in any way is addressed to the work that the Commission is now doing. I have considered the subject with other people, but it had nothing to do with

the work that the Commission is undertaking.

My consideration was an investigation to make as clear a statement as I could showing why I believed the problem could not be solved. My work has absolutely nothing to do with what the I. C. C. is doing. I have done much work on the subject, and have been devoting a great deal of time to it. But that had nothing to do with the I. C. C., or the fact that the I. C. C. is investigating this subject; that is not the motive of my work. The question was not purely academic as far as

I am concerned, but I was employed to do it, though I would prefer not to state personal relations.

943 Adams.

Redirect examination.

By Mr. Wykes:

It is conceivable that a case of confiscation might be so extreme that you could leave out the part of the expenses that must be arbitrarily assigned and reach a conclusion that the rate was confiscatory. This might be so upon 20% of the expenses which admittedly can be assigned, or upon the 50% or thereabouts which it is claimed can be assigned.

ADAMS.

Redirect examination.

By Mr. Butler:

The case might be so extreme that a passenger rate might be shown to be confiscatory without any figures at all, but whether

that is 2.5¢ or 3¢ a mile you cannot tell.

As to whether railroad men familiar with particular roads where conditions are similar might tell with accuracy whether there were any net earnings in that class of business, I think they can with sufficient accuracy to determine whether or not they wanted to go on with the business as a business proposition, but, when you come to apply that to a rate case and say whether or not to clange the rate will be confiscation of property, I ask myself at once what property is used; you bring in all of those nine or ten sets of arbitraries; we have discussed here only one set of arbitraries.

An experienced railroad man, long in charge of property where operating conditions are similar, can form a judgment of much value in the operation of the property upon whether there is any profit in the passenger business, and reasonably accurate for the purpose of administering the property. Upon the question of

whether there is a net return in passenger or freight departments above operating expenses, his judgment would be much better than that of an outsider. Of course, experience must necessarily help a man's judgment. I would prefer to trust his judgment to the judgment resulting from such a computation as implied by the application of this rule of specific cost to specific services.

Q. And you realize, do you not, that an expert employed to examine railroad accounts on a road with which he is not familiar, and has only the data recorded which is required to be recorded by the I. C. C. classification of accounts, other things being equal, is not in nearly so good a position to pass on these questions as the man who is in the accounting department of the road, keeping track of those things

from day to day and week to week, and year to year, and measurably controlling the expenses?

A. I think so, provided the man who is in that position would use his judgment as an operating or accounting man, and not apply to his figures some rule that has been worked out in some other case.

The matter of experting has, I think, resulted in these things and methods and arbitraries I have condemned as useless. I think they have been imposed upon the carriers, and especially the accounting officers, by the courts, and the accounting officers know that they are uesless; I think the accounting officers of this country, if you will take a vote, would vote against them; that is my judgment.

Q. You think the accounting officers all know that these methods

employed by these experts, is simply quackery, don't you?

A. Yes, and their own records, where they, themselves, are called upon to defend their own company in rate cases, they do this because they are requested to do it, and the request seems to come to them, or does come to them, from the decisions of the courts as

to what the courts want to decide the questions upon.

945 The revenue train mileage basis is used by many accountants to divide the principal common expenses in maintenance of way and structures between passenger and freight, and it is modified by a great many of them. A great many railroads use the direct account basis. Mr. Nay makes use of some of it; I cannot answer that he uses it in his office accounts. That, of course, is explainable in this way: There are two uses for this assignment-operating use. and a use in rate cases. I think it is perfectly proper for methods to be used which in and of themselves are not absolutely accurate if you wish to use them for comparative purposes.

My study leads me to say that, while the revenue train mileage is in very common use for the division of the principal items of maintenance of way and structures, it is frequently modified. The modifications I refer to were those used in rate cases, and not the rules

they used for their own offices.

I cannot mention a company that uses any other than the revenue train mileage or its equivalent as a matter of routine on its books for separation of freight and passenger common expenses alter allowing such as they think can be allocated with accuracy, but the fact that I cannot mention it ought not to be accepted as a denial of the fact. I do not know the opposite of it, either. I have not studied this question from the point of view of the regular routine work of accountants in this country. They do not make those divisions between freight and passenger on their books. They make them in their office, and I have not studied the matter from that point of The consensus of opinion of all railroad accountants in this view. country would be valuable o nany subject of that kind. I insist on making the distinction that these methods used

946 by the accountants of railroads, and maintained for so many years, are for the purpose of operating officers, and for uses of comparison, and your questions are misleading when you ask me about the consensus of opinion. The consensus of opinion, when the purpose is one thing, ought to be confined to that purpose, and I do not know, and I do not believe, -indeed, I believe the contrary to true,-that, if you get the consensus of opinion of the auditors of the railroads of the United States, it would be that this rule of specific cost for specific service, as applied to a rate case, is pernicious.

The propriety of dividing these expenses, or of any method, depends upon the purpose of the division. I should approve the use of certain rules, if confined to what operating officers need for statistical and divisional comparisons, but I disapprove, and I believe,-and, from what I know, it is my judgment,-that the accounting officers of railways in this country would agree with me. I disapprove the application of these rules in rate cases. I have talked with the railroad accounting officers on that subject for years.

ADAMS.

Redirect examination.

By Mr. Wykes:

(It is stipulated that the free right of way of plaintiff and its predecessors from the State and Federal Government equalled 130 miles—defendants claimed 147.60 miles, and plaintiff 112.32 miles. Of this, approximately 20 miles came to D. S. S. & A. from the Federal Government, under map of definite location, under Act of March 3, 1875; of the remaining 110 miles, approximately 75 miles came from State grants, the bulk being to D. M. & M., and 35 miles

from the Federal grants, the bulk being to M. H. & O. 947 Defts.' Ex. 41. Adams, sets forth the land grants to the several companies named thereon, being plaintiff's predecessors.)

I have made investigation, to ascertain amounts received by plaintiff or its predecessors in ownership of line of right of way it now owns, or other companies which received the land grants through such predecessors; this is presented by my tabulation. My information regarding M. H. & O. is taken from reports of Michigan Railroad Commission.

By looking into the history of this matter as far as it is possible without going to the records of the company, it appears that in 1881 there was a sale of land grant lands for two and a half millions of dollars, and I should not care to go any farther than to say that, in my judgment, these figures show that at least \$2,655,702 had been realize from those lands; but, certainly, the figures indicate that more than that has been realized, because there are other balances prior to the year when that large balance is recorded.

I have taken that from the printed copies of reports of the companies as printed by the Railroad Commission, using the years 1880-1881. In other years, I also found considerable amounts, apparently proceeds of sale of land grant lands; the largest amount is for 1873,

when the cumulative balance is \$158,503.34.

With regard to the D. M. & M. lands, I found a statement of the receipts and disbursements made by the trustees of the land grant mortgage, February, 1879, to January, 1911. In this statement, the following appears (from Moody's Corporation Manual):

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948	Receipts:

From contracts and deeds	\$1,949,071 2,036,335
From timber sales, cash and bills receivable	
Interest	439,372
Discount and premium on bonds	1,197,234
Mining leases	74,054
Land leases	1,760
Cancelled applications	7,515

\$5,704,541

Disbursements:

Land department	\$834,247
Paid treasurer D. M. & M. R. R.	3,318,318
Tax titles	69
Taxes	278,591 $1,196,800$
Interest on land grant bonds	
Bills receivable (Demand)	0.700
Cash in bank	0,020

\$5,704,541

To determine the amount of benefit received by the railroad, it must be observed that the total receipts are \$5,704,541, of which \$1,196,234 are credited as discounts and premiums on bonds purchased; to this extent, therefore, the total is not a cash receipt. This deduction shows that cash or its equivalent of \$4,508,307 has been received from sales of land, timber, mine leases, etc.; to arrive at the benefit accruing to the railroad, there must be deducted the expense of the land department and taxes, which leaves as a net cash benefit to the road \$3,395,469. The D. M. & M. benefited at least to that amount by these lands. This is in addition to the \$2,555,-702 to the M. H. & O.

(This witness was later called to testify before the Court.)

949

On November 25, 1913.

Prof. Mortimer E. Cooley, a witness called by plaintiff.

Direct examination.

By Mr. Butler:

I am, and have for ten years been, the Dean of the Engineering Department of the University of Michigan; have been connected with that university for 32 years. I am an engineer by profession.

I received my technical education at the United States Naval Acad-

emy, Annapolis, graduating in 1878. In 1881, I was detailed by the Navy Department to teach steam engineering and iron ship building at the University of Michigan. On my arrival, I was made Professor of Mechanical Engineering, and I have had that title and position ever since. My profession is mechanical engineering and allied branches.

I have had considerable experience in valuation work. I have devoted practically my entire time, outside of teaching, to valuation work since 1899, and have directed or had to do with, or caused to be made, physical valuations of public service and railroad properties. The aggregate value of the various kinds of public utility properties I have had to do with is about twelve hundred and fifty millions. Those properties are steam and electric railroads, electric light and power plants, gas plants, water power and water power electric plants, and water works.

In 1900, I had charge of the valuation of the physical properties of all the steam railroads of Michigan, and in 1902 I assisted the Government in Newfoundland in the valuation of the mechanical elements of its railroads. Subsequently, I was Consulting Engineer in the valuation of the Wisconsin railroads, and I had charge of the re-

valuation of Michigan railroads in 1903 and 1905.

950 I have, in a general way, kept myself informed of the progress of valuation practice to the present time; I have had something to do with it every year since 1900, and have from time to time engaged in discussions, prepared a few papers, and made a number of addresses, and lectured on the subject for the past five or six years.

Among the railroads valued in Michigan at the times I referred to I became as familiar with its property as was was the D. S. S. & A.

possible in my position as director of the work.

The amount fixed as the total value of steam railroad properties in Michigan was: The so-called reproduction cost about \$200,000,000; the so-called present value about 82% of that, or something more than

\$160,000,000.

There is now a well known engineering practice on the valuation of public utilities, especially steam railroads. I believe the general practice followed in Michigan in 1900 has been followed in other states where valuations have been made, with some variations. Prior to 1900, there had been no physical valuation of railroads on a large The method adopted in the Michigan valuation was to discover the cost to reproduce the existing properties, with all new elements, then to discover the extent to which the elements actually in use had depreciated, and to affect the cost for new elements by this depreciation, and to determine what we call the present value of the physical elements.

The method followed by me in Michigan has since been known as the reproduction method. That method has generally been applied where physical values of steam railroads have been under-951 I think the engineering practice has in general become settled upon the principles that follow in those valua-There has been considerable discussion of different methods,

but I think the majority of engineers have clung to the practice

inaugurated in 1900, with some variation in details.

Since the Michigan appraisals, I have given no attention to the South Shore, except in a general way, and have not been engaged by plaintiff to do work or testify for it in this litigation, and have had no formal conference with its representatives. I have had, in a general way, some idea of the progress of the work as it has been going on.

In a general way, in the light of the development of the practice since the 1900 appraisal, that is substantially the right way to ascertain reproduction costs of railroad property,—the one which has been followed,—and only the matter of overhead charges has been more completely elaborated than was possible in 1900. It embraces other elements, and treats them in slightly different ways, e. g., contingency, instead of being put in as a lump item spread over the entire cost, is now divided into two parts, at least, and distributed, varying in amount for the different elements, being larger for some and smaller for others. I have been accustomed to divide it into (1) contingency of construction and (2) contingency of inventory.

The contingency of construction is rather a variable item upon different roads. It is illustrated by such things as sink holes, unknown conditions surrounding bridge foundations, etc. The contingency of inventory is intended to cover the omission of things in the schedule. There never has been a complete inventory, I suppose.

In the Michigan appraisal, the contingency item was expressed by a given percentage of the physical items and some of the over-952 head items; it was there taken at 10%. I should — 10% was as near correct as any other percentage. I have never found that I could depart far from it in my own practice; I have in a few cases dropped a little below, and in other cases gone above. I think 10% would apply to a property like the South Shore. The only question which might properly arise concerning a 10% charge might be is to the items to which it is applied, whether to the entire valuation, including overhead costs, or that excluding the overhead costs. My recollection of the 1900 valuation is not entirely clear as to whether we applied contingencies to overhead costs; we did apply it to the physical schedule, including lands; we applied it in the same way to

all the railroads of the State.

Since then, demands have been made by engineers to ascertain the appropriate percentage which should be charged to each item. We attempted to be more specific in the application in 1900, but could not make any investigation, because that valuation was completed in practically 90 days. The nature of the items or costs covered by contingencies do not permit of such analysis as to enable the appraiser to apply an appropriate percentage to each item of the schedule. If the engineer could satisfy himself in advance as to precisely the right element to all for contingencies, he would not need any contingency item. Broadly speaking, the item is to cover the unexpected things in construction and omissions in inventory. Because items are unexpected, and the omissions unknown, the items are called contingencies.

(Objection to reproduction cost theory as immaterial and irrelevant in this case; this objection to stand to all testimony as to reproduction cost.)

In the absence of specific information which might be matters of record, and which would enable us to eliminate, to some extent, the element of doubt, I should not want to make an estimate of the cost of D. S. S. & A. or any other railroad, without allowing 10% for contingency item. I should not want to choose any other percentage in preference to the 10%, unless I had the very

best of reasons to do it.

The fact that on some items, as ballast, contingencies were much less than 10%, or nothing, would not impair the general truth of the statement or my opinion that 10% of the total would be about right. As to contingency applied to equipment, the railroad could reduce its contingency item by contracting to have equipment delivered at a stated price. This would not reduce the contingency item to the builder, which goes in the cost of it. As the contingency item is in the cost to the railroad, it does not have to allow another 10%, but must allow something less.

I have known of instances where the actual cost came below the estimated cost—not as related to railroads, though, but to buildings; I don't think of any such thing in railroad values just at this time.

I don't think there is very much to the claim that conditions which bear upon contingencies are different in case of an existing property and property to be built, where the conditions are not so well known. If the record showing the actual construction cost is available when the valuation is made, then you have information to enable you to eliminate a part, at least, of the contingency item, but, without complete records for the existing property, I think it is more liable to be far more accurate to determine a probable contingency cost from original specifications and plans that it would from an inspection of the property existing.

This is mainly for the reason that conditions existing at the time of construction are described in plans and specifications, and you can make your estimates accordingly, but, when you see the

954 structure after it has been built for a time, there is, or may be, no knowledge of the conditions under which it was built. It is almost impracticable to make a good estimate of the cost of a building without first having plans made to get the proper estimate of quantities. I am of the opinion, after a good many years of thought on that particular point, that it is not only possible, but quite probable, that a more careful estimate of contingencies can be made, from plans and specifications, when the building is first built than after it is built.

I think that would apply to the valuation of the South Shore, unless the actual costs are matters of record, and are available. The lapse of time since making the record might affect the matter seriously, because the conditions under which the work was done originally and under which it would now be done might vary greatly.

At the time of construction of a railroad, the quantities and classes

of material may, during the period of construction, be definitely ascertained, but on appraisal, when records do not disclose quantities and classifications, it is not easy to ascertain correct quantities an l make appropriate classifications, unless care is tak of o make careful

measurements from the actual structure.

It is more difficult to determine the proper estimates years after the structure was built, and then there are many things which have gotten into the structures since they were built that did not enter into the original cost, such as the sinking out of sight of ballast. fore the work is done, the natural surface of the ground at the center line is known; after the work has been done, unless profiles and records have been saved to disclose it, it cannot be ascertained with accuracy, unless you make careful survey again.

In the Michigan appraisal, I applied at least 10% to all 955 the physical items. In my opinion, the amount of contingencies varies among the items, some items taking none and some more than 10%. The application of the 10% was to arrive at a sum which would be fair to cover the item, including both construction and inventory charges. The 10% was a contingency item to be applied to the property as a whole, and not to the individual items; it would not be right to say that I had valued a specific item at the amount placed upon it plus 10%. In the nature of things, the item of contingencies cannot be defined, nor can all the things properly covered by it be listed, either in advance or in the work of the appraiser.

Overhead charges are so called because they are not capable of listing in an inventory as physical quantities, and they are usually applied as percentages based upon the costs of physical elements. The percentages are arrived at by experience. These overhead charges should be arranged in chronological order, cumulating one overhead charge upon the other. The first is organization and preliminary expenses-those prior to actual work in the field, e. g., discussion of the propriety or advisability of building a public utility. Mr. Riggs' inclusion of organization and administration was in accordance with the Michigan appraisal methods, but it did not come

as a preliminary expense,

Such an item as organization and administration is proper to include in a reproduction estimate of an existing property like the The practice of the engineering profession on this is somewhat variable, due, mainly, to ignorance on the part of the investigator.

The percentage to cover organization and legal expenses is applied as a blanket percentage over the cost, without regard to its being a certain percentage on a particular item. It varies with the

different items, as does the contingency item, but the amount 956 which is represented by, say 2.5% of the cost of construction, if properly distributed, would cover the various items of organization and legal expenses.

We have been rather uniform in the percentage applied for these items in Michigan. In the earlier Michigan appraisals, organization and legal was 2% more recently, it has been 2.5%. I doubt if I could answer as to the proper rate for plaintiff, as organization and legal expenses vary greatly, from less than 2% to as high as 4% or 5% in specific instances. The 2% we used in 1900 was as low as could be used, it seems to me, and must, as were lots of other figures than those used, be very conservative. I could not assign a range of percentages within which South Shore would fall, as I have not had occasion to investigate steam railroad properties with a view to determine a percentage range. In my opinion, based on my experience, I should say such a percentage as we have been using in Michigan is very conservative. In stating 4% or 5%, I had in mind conditions in New York, or Manhattan, where preliminary organization and legal expenses were upwards of 4%.

The contingency item is not properly an overhead cost; it is a construction cost, and belongs in the body of the inventory. The organization expense percentage should be applied to the contin-

gencies.

There is a percentage of profit going into the cost of construction which would be added to get the total cost of construction. This is the contractor's profit; it might appear as a percentage or an actual amount. It may be covered in the items, themselves, and usually is. In the Michigan appraisal, we endeavored, as far as possible, to

include contractor's profit in unit cost.

Again basing my statement upon personal observation and knowledge, contractors have made up schedules, when required to do so, in a way which would enable them to reap additional benefits from the items which were almost certain to be called upon as extras in other words, they have made up false schedules, putting increased values upon things which are likely to be called upon as extras, and shading them in other particulars. I am not justify-

ing that, at all; I am merely stating it.

In my own experience in making estimates, I have determined the costs of materials and labor as nearly as I could, and then added my contingency, of 10%, usually, to cover the things which were likely to be omitted, and then added another 10% to cover contractor's profit, and then, judging by the character of the work, have added still something more for uncertainties, as, for instance, having in make specific kinds of work, after I have made my most careful estimates, including these various percentages, I doubled the etnire estimate, to determine what I thought would be the bid we were likely to receive. It has been justified in my own practice. I have in mind today a bit of railroad work, under construction, where the actual costs were estimated at 20¢ a cubic yard, which, I think, is abundant to cover the actual costs; several bids were at the rate of 65¢ a yard, and the contract was awarded at 40¢ a yard.

A fair allowance for contractor's profit, where not otherwise expressed, in estimating reproduction cost of a railroad like the South Shore would be not less than 10%. Contingencies and contractor's profit, whether expressed by percentage or considered a part of the cost of the physical property, are a part of the base to which the

overhead charges should be applied.

I have usually endeavored to apply the engineering and 958 superintendence cost on top of the actual cost of construction. before applying organization and legal expense percentages, as engineering and superintendence are more closely connected with

actual construction.

Engineering: I had rental and preliminary expenses coming in there which might be included in organization and legal expenses. as we have been using the term, or might be included in engineering, but, in the Michigan appraisal, our engineering, as we used it, did not include the preliminary location of the line, but the engineering actually needed in the construction of the line in the location in which the railroad existed. We did not have to make those preliminary surveys; we found the line there.

We included nothing in the Michigan appraisal for preliminary surveys; that work was done, as we imagined the railroad to be reproduced in the same location. The conception of the item of engineering in reproduction problems is different from what it would be in ascertainment of original engineering cost, including location

of the line, etc.

In the Michigan appraisal, nothing was allowed for reconnaissance necessary to locate the feasibleness of the route. We took the roads on our original assumption where we found them; all that work was done.

Q. In that respect, the engineering item would be less than the

money which was necessarily expended in locating a route?

A. Yes. Of course, this should be said: This preliminary expense, if an item were included as preliminary expense in connection with the organization charge, that might include, also, engineering incurred dueing the preliminary investigation, but, if you were to include the preliminary expenses under the head of organization at

1.5%, I should be inclined to suspect it would be rather small.

Q. As compared with what it did cost in fact? 959

A. Yes, that would be my expectation; I really don't know,

as a matter of fact.

In the 1900 appraisal, we were not influenced by the fact that it was made for taxation purposes, except during the first three or four weeks, when positive orders were issued to forget the purpose and proceed precisely as an engineer in making the estimate of the cost

of a new property.

The overhead charges of the 1900 appraisal were used in the later State appraisals, with slight changes. The only changes that we made in the subsequent appraisals, as I recall it now, was to affect our unit costs by the prices which were current at the date of the appraisal-labor and materials, principally. We also took in the ex-In the 1900 appraisal, tension of the property, and the betterments. prices on rails and many other items were taken for a ten-year period, being the average costs during a period of depression and a period of prosperity.

The conception of the Michigan appraisals was that the railroad route had been ascertained, and that the country was developed, as it was in fact developed. Specifically, nothing was added to cover work necessary to locate the line at the time it was built, but only so far as such costs might properly be included in the 1.5% allowed for organization. I have no means of knowing, as a matter of fact, whether the allowances were sufficient for that, or not, but, in my judgment, I should consider the percentages that we did use for organization too small to cover those things. That is also true of engineering. It might cover them for specific roads, but I should say

it was a conservative figure as we applied it.

960 I do not think the 1900 or subsequent Michigan estimates included in engineering or organization anything to cover surveys of highways and routes and their construction. The percentages were agreed upon as representing our best judgment as proper percentages for reconstruction cost.

The reconstruction cost of physical items may be higher or lower than the original cost; some schedules might be much higher and others much lower in original cost, depending on change of conditions, prices of services, etc. Our conception was reproduction, and

our aim was to obtain reproduction cost at the time.

I do not think I know how feasible or practical the original conception of the property and the actual original costs would be for use at the present time. Engineers omitted hundreds and hundreds of things, in getting at reproduction cost, that are not a clearly reproduction cost, though they were incurred as a part of the original construction.

The allowance for engineering varies for the different items, the same as engineering varies. It may be as low as 1% or 2% on some, and as high as 15% on other, items. Our practice in Michigan has been in the neighborhood of 4%, all told, usually distributed, a part of it on the items in the inventory, varied according to the nature of the item, and another general engineering expense over all. We thought we were conservative in using 4%; that embraced items as low as 1% and as high as 10%. A percentage should be allowed for engineering on equipment. I do not recollect whether we were accustomed to make it 1%, 1.5% or 2%; I have gone as high as 2% on electric roads. I do not know whether there is an established engineering practice respecting the allowance of a percentage for engineering on equipment.

961 Another overhead charge is insurance for the property and for the men during construction. My recollection is that we

have used 1%, and in some recent cases we increased it.

The next expense would be interest during construction and taxes. In this part of the country, we have been accustomed to assume that money could be borrowed at 6% per annum, and to use a rate of 6%, allowing for one-half the total amount, which would be equivalent to 3% on the total for the period of construction. In the Michigan appraisal, we assumed that any new work would be put into operation and begin to earn at the end of the year, so the interest item was 3%, but recently, because of the longer period of construction, greater amounts have been considered proper.

In reconstruction of South Shore 6% of the cost of construction for one-half the time would be the very minimum; the earnings

could not be very great if you did get it into operation. In putting into operation a part of a line, it would not be right to take it out of the interest-bearing quantity, unless there was a profit sufficient to

pay the interest.

In my handling of this problem, I have conceived the interest charge to cover a certain definite period agreed upon as the proper period of construction, and, after the road is put into operation, there are certain losses which have to be incurred, in the majority of cases, until the property becomes self-supporting in every respect, and there is another element of cost which must come in, distinct and in addition to the others, but which was not included in any of the Michigan railroad appraisals.

I have not thought of a proper period for construction of the South
Shore road in entirety. I have not been over the property regez cently. I should say at least a couple of years—possibly

three—would be required before the property, as a whole, would be completed and put into operation. Of course, parts of it could be constructed in a single season, and put into operation at the end of the season. I suppose winter weather in Upper Peninsula might have considerable effect.

I understand the almost universal practice to be to allow at the rate of 6% per annum on the full amount required to reproduce the

property for one-half the time required to produce it.

Two distinct ideas of depreciation are found in every public utility property. One, a fixed depreciation, is that which, once obtained, may possibly be maintained indefinitely at, say 85%; you have lost 15%, due to the fact that the property can never be brought back to its condition new. This is frequently spoken of as depreciation, and is what I term fixed depreciation.

The second depreciation occurs from time to time and must be made good out of earnings to keep the property at a percentage of condition that renders it efficient. The fixed depreciation, for which I used 15% by way of illustration, cannot be replaced. To obtain the 85%, you must first spend 100% and then must maintain it in per-

petuity.

The 85% was simply illustrative of a condition that would be efficient; 85% would be 100% efficiency; in certain classes of property, 80% might be 100% efficiency; in other classes of property, it might require 90% to be 100% efficiency. In the 1900 appraisal, we found about 82% for all the properties of the state.

Depending on the kind of property, there would be a condition of maintenance—say, 90%, 85%, 80%, or possibly less—at which efficiency would be equivalent to 100% of a brand new prop-

963 erty. I used 100% to represent the cost of reproducing the physical parts, and 85% to illustrate the condition of a railroad property in use, and assumed that the 85% of physical condition would be sufficient to keep the property in 100% efficiency; that is, as useful for purposes of transportation as if brand new.

You can never have a property operated in 100% condition; it is impossible to maintain it with all elements new, there being constantly replaced new elements to keep the 85%, and, from the prac-

tical standpoint of an operating structure, the condition of 85% realizes the maximum efficiency of which the property is capable, and, being the maximum, is 100% efficiency. We might go further, and say that with the passage of a few years, which brings the condition of the elements of the property to a stable condition, it is more efficient than if brand new. The stability of the railroad can only be had with years of use. This stability is in the solidity of banks, settling of ballast, and ties in the ballast, and all those things, which make the roadbed safe, efficient and keep it in alignment and surface.

We have been obliged to spend 100% to maintain the property at all; we can never have the 100% back, but we can keep in perpetuity some percentage less than 100, namely, 85%, 80% or 90%,

as the case may be.

With cost of reproduction \$10,000,000, instead of indicating average condition of 85%, or \$8,500,000, in applying these figures in the ascertainment of the ultimate question of the fair present value of the road, it may be said to be worth at least what it would cost new, unless the 15% has been restored to the investors out of earnings.

(Objection that discussion upon the point is foreclosed by the decisions.) As an engineer, I should say that a road well maintained which will inventory 85% of its new condition is worth as 964 much for use to serve the public as the same road would be, or

was, when brand new.

I could not answer as to whether it would be practical or possible, having due regard to economy, to maintain the South Shore at a higher percentage of condition than 85%. It would be impossible to maintain a railroad so that it would inventory 100% condition. The average for Michigan for 1900, including good and bad roads, was about 82%, some being higher and some less. I would say, when a road was maintained at or near 85%, it was pretty close to the point at which the best results, economically, might be expected.

Some elements of the property appreciate in value with lapse of time and maintenance, being particularly that part of the roadbed below the ties. I have never given study to the subject, or attempted to analyze any railroad property with a view to determining what the appreciation might be. While we considered the elements in the Michigan valuation, we made no figures or allowances. It is my opinion that appreciation should be taken into account in getting

at the present value.

Assuming two properties with reproduction cost the same, one brand new and the other 10 years old, the present value column of the older would be greater than that of the newer road. Perhaps I have not selected a long enough period to make the statement literally correct, but the principle would be the same. The appreciation comes about in increased solidity of embankments and increased thickness of ballast, which is constantly put under the ties and distributed in the embankments, thereby enriching them, making them more stable, improving the drainage, increasing the safety, in greater solidity and increased permanency of roadbed, and

the case with which the grades and alignments are maintained, thereby reducing operating costs in the hauling power and the maintenance expense. Such appreciation of an old roadbed 965 with lapse of time is recognized as a substantial element of

value by railroad engineers, generally.

The increment would depend very much on time. I should not expect the appreciation of a roadbed to offset the entire depreciation of the physical elements from 100% to 85%. Any figure I would give would be in the nature of a guess; it would vary with different roads; it would depend on the character of the soil in the roadbed, and of the earth upon which the embankments rest, the height of

embankments, character of slopes, cuts, etc.

I could not say, precisely, how the element of appreciation could be measured or estimated. I think it necessary to make a study from an economic point of view, rather than from a purely engineering point of view, i. e., compare the roads from an operating standpoint, with a view to costs of hauling over them and expenditures for maintenance. It would undoubtedly be a combination of both economics and engineering. I have no doubt that, from a proper study of a specific property, an approximate estimate could be reached with some degree of certainty, if the problem were approached in the right way. Every property would stand on it own basis.

I have made no study, whatever, except in the most general way. I have seen neither the reports of Mr. Hansel or Mr. Riggs on South Shore, and have not heard anything about them, except in a most general way. All my answers have been based on my general information and knowledge of the subject. I have not accepted employment by this railroad to do any work in this case for it. I declined employment two years ago. I have been employed by the State of Michigan in connection with its several appraisals, and I consider my services at the disposal of the State prior to anyone else.

COOLEY. 966

Cross-examination.

By Mr. Wykes:

The cost of reproduction method was first used in the Michigan

1900 appraisal.

In the 1900 appraisal, we were given unlimited funds, and I was permitted to do whatever I thought best, the only requirement being that I produce results before the expiration of the year. I had free swing in the selection of the men and the salaries paid. ployed Aug. 27, 1900, and the value of the railroad properties was in the hands of the Tax Commission prior to Jan. 1, 1901, though not in final form, as the closing of the field work, checking, continued later, and a second set of values was submitted the latter part of January. The actual work continued from Aug. 27 until some time the next June, before the final reports were obtained,

After the preparation of the tentative report, we went on and made such corrections or alterations as were necessary to prepare as complete a work as we could be June. The work, after January, was in the nature of checking; there was no change of policies, and no re-

valuations or re-inspections, as I recall,

The present value, as reached through the cost of reproduction less depreciation method, is not of necessity the value of the property, either for taxation, sale or anything else; it is just value of the physical elements. Its value for any purpose depends upon the purpose that you are using it for. The physical value or present worth may be greater or it may be less than the actual value in a commercial sense.

There is one value to the purchaser in a commercial sense, i. e., the ability to pay dividends, and another value to the community served, independent of dividends. I am not so sure that the 967 present value through the cost of reproduction method is not of necessity the value for either of those purposes. I won't say that it is or is not. The thought comes to my mind that the cost less depreciation might measure the value to the community, and that the community could well afford to maintain the property at its present physical value, in order to be served, without any regard to dividends.

The value found in the method I applied is not of necessity the same value as the value to the community, or the commercial value.

though it might be coincidence be the same as either.

The application of the cost of reproduction method involves the conception of the removal of the property; to work it out would in fact require the removal. You cannot work out the removal; you cannot put the railroad back in this specific place, because there is another railroad there; so, instead of working the problem, it involves the conception. It involves the conception of the production from private owners of property now belonging to the railroad company; it would be impossible to work out in practice, because the property is not now individually owned, but the right of way is in the unity in which we find it. It involves the conception of the application to the real estate, not of the prices that put it there, but of the judgment and conception of what would be proper today with added multipliers.

The question of multipliers has, I think, gotten beyond the conception period, and into the practical period, in that it was easy to ascertain the going value of adjacent or nearby lands by reference to the county records of sales, and, also, from the same source, to find actual prices paid by railroads for new right of way in the vicinity, and thus to establish a ratio between the going value of the land

and the actual price to railroads.

968 The cost of reproduction method has come into quite general use since 1900. I know of no engineer who claims that the result is commercial value, and I have never heard it claimed by anyone, though it might by coincidence be the same. I understood from the question that commercial value meant sale value, and an ability to pay dividends, as distinguished from necessity.

In some of the elements, it cost less to put the South Shore there than the present cost of reproduction affected by depreciation. I am not prepared to say that it presumably cost less as a whole; I do not know. On rails, and certain elements, the road would cost more when built that today, and on certain other elements would cost more today than when built. Where the matter would land, I do not know. I think it would — difficult of ascertainment, unless you had access to the records.

The work of the 1900 appraisal was as carefully performed as it could be within the time given to it. We were unlimited in funds, and fortunate in getting men of experience. We endeavored to do the best possible job in the time at our disposal, and I think we did a

good job.

In 1903, I was again called upon to value 28 different railroads in Michigan, very nearly all the railroad property, in value, in the state being represented in the suit. The valuation proceeded along the lines and the same methods as the 1900 valuation. I do not know any better plan than that. The 1902-1903 valuation comprehended bringing the 1900 valuation down to date. I had done valuation work in the meantime.

In the work of 1902 and 1903, we applied the same percentages as in 1900; we simply changed the unit costs, and introduced cash on hand and stores and supplies, as I recall. The same overhead percentages were added, straight through. We did not add

percentages were added, straight through. We did not add 10% for contractor's profit; we assumed our unit figures cov-

ered that.

From 1900 to 1905, I was engaged in valuation work. In 1905, I superintended another appraisal of certain Michigan railroads. That valuation was made in great haste, to determine whether the State Board of Assessors had assessed the railroad property high enough. The public believed the values of the railroads were not high enough, and the Attorney General was requested to produce information, and be proceeded to produce it, with the result that the assessed value was quite considerably increased.

This was on the basis of a report made by myself and supplemented by Prof. Adams. In the appraisal of 1905, we added the additions and betterments, and revised our unit prices to meet the prices of 1905; that is what we tried to do. We had difficulty in getting information at that time from the railroads; some of them declined to furnish it as to the extent of betterments and extensions, and we had to get the information the best way possible. In those instances, we took them from their reports to public authorities; also from our ex-

aminations in the field, to a limited extent.

From 1900 to 1905 was a period of raising prices. In 1907, we had a period of depression which was possibly reflected or anticipated in 1905. Our values went from \$2,000,000, in 1900, to \$235,000,000 or \$240,000,000, in 1902-1903, and to \$285,000,000 or \$290,000,000 in 1905; that included new construction, new locomotives, etc. In each of these later appraisals, there was on honest effort on my part to reach the value of the railroads. I believe we used the same percentages for contingencies and overheads in all the Michigan State ap-

praisals, and we are still using them in approximately the same way we did then.

970 In recent work for the Railroad Commission, I think my overhead charges are a little larger, in aggregate, than in the State appraisals. We have re-distributed them, though, and we still omit discounts and the cost of procuring a going concern. We still include contractor's profit in unit prices, and include contingencies, engineering, insurance, interest during construction, working capital and stores and supplies.

I have not, in general, kept watch of prices, and do not know whether they have been increasing, except in the most general way. I understand the general tendency of prices is upward, but I do not

know that of my own knowledge.

In the 1900 appraisal, the unit prices covered a period of 10 years, so as to have a period of depression as well as of good times. In 1902-1903, our instructions were to appraise as of April, 1902, and in April, 1905, we used the date of assessment. I am not so sure that that would be inconsistent with the assumption that it would take one to four years to reproduce the property, as the estimates of cost of construction would be made at some particular time, and at the prices then current, though certain articles might be advanced and others decline in price before actually purchased. On the three or four year period of construction, I would not assume letting the entire contract at any time, because it would be the matter of a number of contracts covering different elements that enter into it in addition to contracts for certain parts of right of way.

I do not, at the present time, see any other percentage than 10% that I would prefer for contingencies; there might be occasions where the percentage might be shaded, and others where it might have to be

increased, but, generally speaking, 10% would be fair to cover contingencies. I had the feeling later on in considering the 1900 appraisal that we might properly have used a greater percentage, owing to the haste with which the appraisal was made, but it was good enough for the purpose, and was a common percentage to apply, and we used it, as engineers ordinarily use 10%. It is possible that the contingencies might have been considerably less than the 10%, and it might have gone much above.

I do not know whether I wish to subscribe to the statement that if the estimates were high enough the contingency percentage would have disappeared altogether. You can conceive that the estimates might have been made high enough, but, if they were, the contingency percentage would have been included in one form or another, perhaps not as a separate percentage, but it would be a contingency item, whether it came in as a percentage or in some other way.

The contractor, in taking a certain amount of work, say grading on 10 or more miles of line, assumes contingencies in his price. In any part of the work, if there is contingencies, the contractor bears more or less of it. If the contractor has properly made his price, he has included in it those contingencies he must himself sustain, and also his profit. To the extent to which the inventory is perfected, the percentage of contingencies to cover that grows less.

The contingency of construction would cover the unforeseen things that would be encountered during the construction process, while the contingency of inventory would consist of omissions from the inventory of items. If you could make the inventory perfect enough, there would not be any contingencies of inventory. not, of necessity, remove the contingency of construction.

The contingency of construction might be a sink hole. 972 a special percentage were added for sink holes, etc., it might or might not care for that, depending on whether it was enough. In the case of a railroad built in part three times, they would probably have to add for that particular element of the road 300%, because it would have to be built over three times. Another common contingency is bridge foundations, whether quick sand or floods are Another is where a train rushes on to a bridge encountered or not. during erection and wrecks it.

I have enumerated no specific items of contingencies as being inevitably in connection with the property; however, contingencies of some sort would be inevitable in connection with every property; their amount would be contingent, and it might be 7% or 20%, or

even 5% or 40%, on individual items.

Ordinarily, a better estimate of the cost can be made from the plans than from actual construction. The incidents I have just referred to are illustrative of the reverse of that, where the actual result is better than planned.

The contingency of injuries to employees is usually included nder insurance. We have tried, in our valuations, to include it under insurance.

To refer to it in both places would be duplication.

To the best of my recollection, our organization, administration or engineering included nothing for the preliminary expenses de-I cannot be entirely certain at this time, and my recollection may be at fault.

In recent work, I have been dividing the contingency of construction and that of inventory about equally; that is, assuming a 5% construction contingency distributed among the several

items in various percentages and then adding an overhead 973 contingency of 5%, which I have called inventory contin-I have assumed them to be equal, ordinarily, and have always aimed to have them around 8% or 10%, altogether—ordinarily, 10%; they might run under or over that, and the percentage of allowance would be variable as to different roads and as to different localities. It would naturally be variable and depend a good deal upon the completeness of records, especially the inventory contin-In saying hundreds and hundreds of items would be omitted from an inventory, I had in mind individual items, such as tools and things of that kind; there could not well be hundreds of classes of items.

The contingency item on real estate in the 1900 appraisal, in the light of the second and third appraisals, was far in excess of the 10% we added, owing to the lack of time and opportunity to investi-

gate actually the cost of right of way to railroads.

The 1900 appraisal was made under great difficulties, so far as the obtaining of information was concerned-both difficulties in not having access to records and difficulties of determining the character and value of the land through which the right of way was My belief, at the time the figures were submitted, was that we were far under the actual cost of right of way. On an appraisal today, assuming the railroads to be friendly to it, and the books correctly kept, and possibility to ascertain the costs under those circumstances, I should not care to add a 10% contingency to items which were matters of record.

Even when you have made the best computation possible, it seems to me that there is still justifiable a contingency on right of way. If we had an absolutely true inventory, then we would have no need of contingency. I maintain and insist that a true inventory is abso-

lutely impracticable, except in theory.

There is a possibility of getting unit prices and arbitraries for land and overhead percentages too high, as well as too 974 I would not say there was a probability of getting them too high, the overhead charges, particularly, as the knowledge of the average man investigating public utility property is insufficient to give him a correct opinion of what actually takes place in the construction; they haven't the knowledge and experience of things which enable them to form a judgment.

It is my belief, after many years of special investigation and study, that the average mind does not comprehend the actual expense incurred, both in the construction and in the overhead charges, par-In saying the "average mind," ticularly in the overhead charges. I applied it to the man whose experience has not been special along To illustrate, a prominent engineer said to me, of overhead charges, "I dare not consent to their appearing as so and so, because the public won't believe me." By the average mind, I mean the average citizen, who has not had experience in these things, to whom the engineer makes his reports. His idea was that these percentages must be tempered with what will be accepted.

The overhead percentages are often and entirely estimates based upon experience with similar properties, and not matters of actual There is no way of checking them, absolutely, withascertainment. out carefully kept records of expense, as the property is actually built. There is no way of furnishing an absolute check as to what the conditions would be on the specific property, because the reproduction It is the same kind of an estimate that the encost is an estimate. gineer or contractor makes in connection with new plans; it is his

judgment, based on his experience.

I am not a constructing engineer, in the sense of taking contracts and building things myself. In earlier days, I 975 made plans, superintended actual engineering work, and had opportunity to ascertain the difference between estimated and actual costs of construction in certain kinds of work, particularly those relating to mechanical engineering.

In recent years, for public utilities property, I have worked for both the public and the corporations. I have had access to the books and records, and counseled with expert accountants and others in their analysis, and it has thrown upon my own experience a light which was before impossible. None of the books contained a separation of the charges into the items I used in my appraisal. I have had opportunity to investigate costs, operating expenses and depreciation in electric street railways, where eight or ten groups were possible of separation, but not 30 or 40 groups, as in the Michigan appraisals. Not from my personal examination, but from examinations by public accountants, it has been possible to separate contingency or similar items so as to determine percentages.

On grading, I would expect contingencies to arise from lack of information regarding character of soil, e. g., estimates of earth act-

ually found to be rock-an extreme illustration.

It is difficult for the contractor, in making estimates of cost in expectation of building, to say when he will encounter rock or hard pan; it is also difficult for the engineer, in going over a right of way for purpose of making an appraisal.

That contingency bears upon the classification and the arriving at greater or less quantities of higher priced material than is actually there. The estimate of rock may under-run or over-run the actual quantities moved; the error of classification

may go both ways, and the rock moved may be greater or less than

provided for in the inventory.

Sink holes and other things which come in are frequently very likely to be serious when encountered. I do not know whether you would expect one or more on a long construction, or not, unless you are entirely familiar with the country; in that case, you might figure on them. I doubt whether I could mention any other than one specific instance; I remember that case, because it was nearby and notable. In Southern Michigan, I should say, sink holes are encountered quite generally, though I cannot instance another case. My impression is that the Grand Trunk had a similar trouble east of Lansing; the Michigan Central had similar trouble between Dexter and Jackson, years after the road was built.

Q. Are there any other contingencies that you desire to refer to

or that you can refer to in the item of grading?

A. I haven't attempted to make up any lists of contingencies; I simply mentioned the things which occurred to me, offhand. I haven't given this any thought with a view to making up lists that would enable me to answer the question completely.

Q. You have no more in mind now with reference to the item of

grading?

A. Not at this particular moment.

There would be less necessity for a large contingency item on ties than in other elements of construction. As I recall it, I think we omitted freight on ties in 1900, through oversight. I mention that as a thing liable to happen in making up an inventory. I

977 think anyone, even though having had great experience in inventory and appraisal work, will say that there never was a complete inventory, and that it always falls under, and never goes over, so far as the inventory schedule is concerned. I do not mean as far as the prices are concerned.

On ties, rails and track fastenings, contingencies would not be likely to occur in inventory, but might occur on prices, because of delivery, distribution, delay of material to arrive, etc. On ballast, contingencies could occur on that sinking out of sight; it might be

estimated as 12 inches thick when it was in fact two feet.

I would not appraise as ballast that which had gone into the fills. The ballast going into the embankment to a greater depth than, say, 9 inches would be covered by contingency item. The actual quantities present would be treated and included at grading prices. The ballast over nine or twelve inches below the tie would not have been put there at ballast prices as fill, but would have been put there at fill prices, and would have been fill material, if it had not been for the conditions that forced it down there. This ballast should not be included in both contingencies and in amount added to cover solidification and incident items.

The ballast, generally speaking, put into the road after the first construction is a maintenance charge, and goes to operating expenses. This is renewal of ballast. The practice is to replace a portion of the road, continuously, every year, rather than the entire road.

Take 20 miles of road, ballasted six or seven years ago, with no general re-ballasting since, presumably, the time is approaching when there must be a general replacing of it, if it is to be kept to 85% of condition, or 100% of efficiency. There might or might not be a depreciation in the ballast, for the ballast that is

978 there might be just as good as ever, but it is replaced for the purpose of bringing the road into alignment, or correcting the grade, or something of that sort, more than because the ballast is worn out. When put there, there was no present necessity of putting other ballast there. A time arrives when more ballast must be put there, to keep the road to the percentage of operating

efficiency desired.

Good management requires more ballast there, because the old ballast will not longer serve the purpose of good railroad operations. From the standpoint of efficient railroad operation, that ballast must be replaced or supplemented, and, therefore, has depreciated. Railroads do renew their ballast whenever necessary, and they do it to improve the conditions of operation. The ballast gets out of place; it can be, and is, replaced, by putting additional ballast on top. To use the same ballast, without adding new, you would have to remove the ballast and bring the earth fill up. The ballast itself has not depreciated, but has gotten out of place; it has depreciated by no longer being in the place where it ought to be to serve the railroad purpose as ballast.

The contingency which we might find in labor would be that you might have estimated that it cost so much, or took so much labor, to perform the work, and it did not take that much, or it took more. It is liable to go both ways, but, as a rule, it goes one way, as the contractor desires the work, and makes his bid as low as he can. If there is a contract at a certain price per mile for track laying and surfacing, the contingency goes on to the contractor; it is there, nevertheless, and the engineer makes the same mistake. Both the

contractor and the engineer, in figuring the unit price, take account of the elements of uncertainty; they would make them too small, rather than too large, but they may get them too large. They are

far more likely to make them too small, because of the desire of everybody to do the work, if it is possible to do it, and 979 because of the realization that if the costs are too large the work won't be done at all.

Q. Is that susceptible of the conclusion that contractors ordinarily lose money on these jobs?

A. No, I don't think it is.

Q. And they don't ordinarily lose money?

A. I don't think they ordinarily lose money on these jobs.

Q. They ordinarily have the price high enough to get their profit?

A. They ordinarily have their price high enough to come out ahead of the game, but not necessarily to get the profit which they estimated.

They may get more than the profit which they estimated. have several cases in mind, very much more. And they often come out just even, and they occasionally come out in the hole. But the tendency. I think, without any question, is to under-estimate rather than to over-estimate.

The 4% for engineering in railroad appraisal work was adopted in 1900 as the result of a conference of chief and maintenance of way engineers and others who had spent their professional lives in railroad construction. They agreed upon that as fairly representative of the cost. I have taken the consensus of the opinion of the men associated with me, rather than making any computation from point to point to get the percentage.

For some steam railroad work, I have never attempted any detail work to verify the percentage, though I have verified it in other cases. The 4% is low, as compared with other work, e. g., architectural and mechanical engineering. The average construction work engaged in by a mechanical engineer may represent \$50,000,

980 or \$100,000. The labor and time required for plans and specifications for a small job is about as large as for a big one, and, proportioning this cost on a small job, it sometimes goes as high as 20%, but, if you increase the cost to, say, ten time- as much, it might fall to 2% or 3%. It depends, to a considerable extent, upon the amount of work.

This system would not apply to railroad work, as that embraces a large amount of territory where a mechanical job—e.g., power plant—is in a single spot. There would be a variation due to the extent of the work even on a railroad. On two similar properties, the greater in extent and cost would bear the less rate of engineering.

It might easily result that a closer estimate could be made from plans and specifications than in inventory of a constructed property, where there were no plans and specifications. This applies to contingency of inventory, as well as of construction. It is possible for a more complete inventory with the constructed property, but I do not say it is probable. The possibility depends upon the completeness of the research. With plans and specifications showing in detail all the things you are bound to incorporate in a building I believe it is more than possible to do a better piece of work in advance than after the

work is done.

There is the possibility, if you were to obtain every bit of information, taking time and incurring expense,-but I am unable to say that it is at all more probable,—that you would reach a better inventory from the building actually constructed than from having plans and specifications before you. The more I have gone into it, the

more confident I am that a better estimate can be made from plans and specifications than from the structure itself. If you 981 have the plans and the structure, I think you can reach a bet-

ter inventory after construction than before.

Changes in almost all work take place, more or less, during the progress of the construction work, and would vary in estimate made from the original plans. In railroad construction work, the estimates are based on computations from profiles, and then they are changed more or less from actual measurements afterwards. the plans might not furnish any actual indication of what was done.

Whatever the added value of a railroad, by reason of adaptability, solidification, etc., would be in proportion to the period of operation up to a certain time, after which it might not change very much. I should expect it to go on in a moderate degree. I should say this would go on more rapidly in a railroad well maintained than in one

not so well maintained.

The adaptation, etc., does not occur from operation alone, as an embankment without use would improve as years went by, though not maintained; e. g., it has grown to be more nearly like the original earth, and gets the qualities which come with that solidity that accu-

mulates with the years regardless of any use of the surface.

The equipment today is perhaps twice or three times as heavy as it We are using locomotives at least three times the was 20 years ago. weight of those that were used in 1900, when the appraisal was made. The bridges have all had to be rebuilt, the rails have had to be renewed and increased in weight, and many things have taken place in the last few years in railroad traffic which seems to me might easily have disturbed the condition of the embankment over what might have taken place if the increase in weight of rolling stock had not come about.

I have never known of the appreciation due to adaptation 982 and solidification being charged into capital; I think it is a condition of value which has come about without appearing in the books, except as an operating cost. In a greater or less degree, this goes on forever, except as it may be modified or affected by the

heavier traffic now on railroads.

In stating, yesterday, that on certain items the engineering charge would amount to 15%, I referred to a railroad in which there is a power plant involved. I did not refer to South Shore. The shops, electric light plant, and things of that kind, on South Shore would have to be rather small to make propert a 4% engineering charge for the entire property. On some of the items, the engineering per cent might - 1%; I put that as a sort of minimum.

The engineering on equipment would run less than on something else. I do not know that it would be as low as 1%; it might run down to half what it would be on an average; I do not know where it would land. It would depend upon how much time was required in localities served by South Shore to determine the fitness of particular equipment. I do not think the percentage can be expressed as a particular item, talking at long range, as we are. I think the engineering percentage must be the best judgment of the man actually engaged in the work, and who found the percentage by experience. The same would be true of organization, legal expenses, and, in a measure, administration.

The theory of reproduction cost takes the value, today, of all elements,—land, labor and materials,—regardless of the cost. The contingency percentage would be figured, not upon the original cost to put the structure there, but upon the increased cost which represents the value of the elements today. The same thing is true of every

overhead percentage. Assuming a multiple applied to lands, that would be applied on today's prices, regardless of original cost. The reproduction theory disregards the history of the railroad, and takes the conditions as of the date when the valuation is made. The reproduction on South Shore might be more and might be less than the original cost. I would doubt its being less without a careful examination.

Assuming a structure having a 20-year life, and now carried at 50% condition, presumably, at the end of the 20 years it would be a matter of economy, and add to efficiency of operation, to renew, but it is quite possible to maintain the property in 50% condition indefinitely. I think 50% condition would be proper for a structure that would be replaced next year; it might be even higher. 50% does not necessarily indicate that half the normal life remains; it might easily result that a property maintained in 50% condition is producing earnings that would be equivalent to a property maintained in 85% condition; e. g., ties in a low condition permit the doing of business the same as if they were in 85% condition.

It seems to me that as long as the ties are used with reasonable safety they are entitled to have a value assigned to them, because they are performing the service of a more expensive tie. This, regardless of the fact that next year an expenditure must be provided out of operating expenses to replace them. As soon as that tie is in use to carry traffic, it has a value. It is a matter of record that the average condition of all the ties for all the railroads in Michigin for 1900 was 56%; that comprehends nomal replacements, and it is a matter of common engineering knowledge that, so far as railroad ties are concerned, they always exist at a value of between 50% and 60%.

If a particular group of ties stood at 35% condition, and it was possible to do business over them, they ought to be entered on the books as of 35% value. I am speaking of the physical life.

In a building, with a normal life of 20 years, that is within one year of having run its life, that structure should be carried as in 50% condition, as it is doing the work of a 100% structure, and, therefore, must have value. The 100% condition will carry.

without more investment, the work of the road that it performs for 20 years.

Q. The 50% condition, under the illustration, will carry it but one

year, is the percentage correct?

A. There is where you have fallen down in your statement, or in your argument, or in your thought. The structure of 50% condition does not of necessity become valueless next year, because it can be maintained indefinitely in a 50% condition; it is question of whether it is expedient to continue that structure in the service of the company; it may be inexpedient; it may be altogether desirable, from an economical point of view, to replace it with a new structure. But you can maintain that structure in a 50% condition indefinitely. The structure has presumably become obsolete if it has to be replaced in the near future. Obsolescene is one element of depreciation.

Q. When you take depreciation coupled with obsolescence, that structure is carried at too high a percentage, if it is carried at 50%;

that is true, is it not?

A. I won't fix any percentage as representing what it should be carried at. I am not contending for that. I am contending for the general principle that a structure can be carried at any desired percentage indefinitely.

In a structure of material which depreciates, you can constantly renew the worn out parts, which will always maintain it at some particular or desired percentage of effectiveness and efficiency. It may be maintained at a given percentage, and, as long as it is

so maintained, it can continue to perform the service for which 985 designed. It may not be economy to do so; it may be far better, from a standpoint of economy, to wreck a car, save its scrap value, and put in a new car. There are plenty of examples of obsolescence making machinery in almost any percentage of condition valueless for continued service.

In making a valuation of a railroad, if a bridge were found in 50% physical condition, and it was known to be insufficient to carry the traffic, and known that it would be replaced next year, I would not consider that obsolescence, in putting on the percentage of condition, and would not reduce it below the 50% of physical condition

that the inspection showed it had.

COOLEY.

Redirect examination.

By Mr. Butler:

It is the practice to include an item in cost of reproduction for working capital. This is usually arrived at by examining the books, to discover amounts necessary to carry on the business in the past. I recall no case w-ere we departed from the amount actually disclosed to have been necessary in conducting the business; it may be either more or less.

The history of the development and use of the property and the costs from time to time incurred is used as a guide to what is right

in reproduction items, especially for working capital and going concern cost. For promotion, administration cost and general expenses during construction, the history of the existing property and similar properties recently created, where fully and correctly re-corded, is used by reproduction appraisers in reaching just conclusions and establishing right figures, particularly in the case of interest during construction.

986 Contingencies is to cover errors in estimates, deficiencies in unit prices, etc. The 10% in 1900 was found too small to cover such errors, omissions and deficiencies in allowances on lands, and subsequent experience indicated that 30% to 50% should have been added to that item. The land values were altogether too small

in 1900. We did add 10%

There need be no contingency if a sufficient sum be estimated for each particular item, er if each particular item includes contingency, but I cannot seriously conceive of such a condition existing in any Land is an item where a contingency percentage over property. the whole item is necessary. It is more expedient to make use of a contingency item than to attempt to secure greater accuracy by prolonged investigation. I do not see how it would be possible, and do not think it practicable, to apply a contingency for each parcel of The uniform practice among reproduction value engineers is to apply a contingency to the land item. I have never known of an appraisal involving land where a contingency was not allowed, nor have I ever known of an estimate of any kind being made by a competent engineer where contingency was not allowed. I did not know that Mr. Hansel did not include a contingency for land.

Mr. Wykes: The novelty is that the Supreme Court of the United States has agreed with Mr. Hansel on that precise point since he made that schedule. (See 230 U. S. 455.)

Mr. Butler: The novelty about that is that Mr. Wykes is mistaken.

The Witness: And a still further novelty is that the Supreme Court, if it did that, is absolutely, utterly mistaken.

The uniform practice of reproduction engineers is to add contin-

gency item to bridges, trestles and culverts. 987

Contingency item includes unforeseen conditions in performance of work, e. g., inability or difficulty to secure transportation of labor, strikes, weather conditions, etc. It is the uniform practice of reproduction engineers to add contingency percentage to item 6, Ties, and also to all items of construction. 7 to 15 inclusive of Hansel's appraisal all being elements of construction, an engineer would allow a contingency item on them, and I know of no reason why contingency should not be allowed on items 17, 18 and 19 of the appraisal.

The allowance of 10% contingency does not indicate that amount chargeable to the property in each item, but that it is a correct allowance for the whole, as there may be contingencies on some items and not on others. In recent application of contingency percentages, they have been applied in varying amounts to the different elements,

but, in the aggregate, they have approximated 10% of the total cost. The inventory contingency is usually applied as a blanket percentage at the end of the construction items. In recent years, I have endeavored to apply the most suitable contingency to the items making up the schedules, and afterwards the blanket percentage of the same to the whole.

Likewise, in engineering, in recent years, effort has been made to apply to the different elements of the schedule a proper, and afterwards a general, percentage. The aggregate would remain the same, but this is the much more logical application. Items 20 to 28 inclusive should each have a contingency applied to them; that is the

uniform practice, as far as I know.

The practice is to allow contingency upon the equipment items, though not usually on the overhead items. In the 1900 appraisal, we applied it to everything. At first, it was the practice to apply

the contingencies to the overhead items, but, lately, this contingency is thought to be a part of the actual construction.

The other overhead items are, today, usually applied to con-

tingency and other items, except overhead.

Mr. Wykes: I wish at this time to call to the attention of counsel for the plaintiff certain things which I think it is their duty to prove in this case, and the duty of every railroad company to prove in cases of this character.

The defendants call upon the plaintiff to, and demand that it do, make proof of each of the following matters and things. The defendants hereupon agree that the plaintiff shall be given a reasonable period of time in which to make proof of said items and things, in case it shall announce upon the record its purpose and desire to comply with this request and demand, and make such proof.

(1) The fair value of the property used by the plaintiff for the public, other than and separate and independent from and in addition to the cost of reproduction affected by depreciation to represent present condition.

(2) The original cost of construction of the property used by

plaintiff in serving the public.

(3) The amount expended in permanent improvement upon such property since acquisition.

(4) The amount and market value of its stock and bonds.(5) The present, as compared with the original, cost of construc-

(6) The unearned increment, meaning thereby the increase in value due to causes other than earnings and other than investment of additional capital by the plaintiff in lands owned by it, including the amount of such unearned increment accruing or added to the value of the property from year to year.

(7) The unearned increment in property other than land, due to increases in prices of labor or material, or otherwise, and the amount thereof accruing or added to the value of the property from year to year.

(8) The amount of right of way and station grounds donated or

granted free of cost by the Federal Government for right of way and station ground purposes.

(9) The amount of right of way and station grounds donated or granted free of cost by the State of Michigan for right of way and station ground purposes.

(10) The extent and amount of all land grants or donations of land other than for use for right of way purposes and as station grounds by the Federal Government as an aid to the construction of plaintiff's railroad, or any part thereof, whether such land was granted or conveyed to plaintiff directly or indirectly, or to or for or on account of any of its predecessors in ownership of the said line of railroad, or any part thereof, directly or indirectly.

(11) The extent and amount of all land grants or donations of land other than for use for right of way purposes and as station grounds by the State of Michigan as an aid to the construction of plaintiff's railroad, or any part thereof, whether such land was granted or conveyed to plaintiff directly or indirectly, or to or for or on account of any of its predecessors in ownership of the said line of railroad, or any part thereof, directly or indirectly.

990 (12) The proceeds from the sale of all land grants or donations by the Federal Government, whether received directly or indirectly, and when and how received.

(13) The proceeds from the sale of all land grants or donations by the State of Michigan, whether received directly or indirectly, and when and how received.

(14) The commercial value of the property used by plaintiff in serving the public.

Appreciation takes place by use and lapse of time, without regard to work or expenditure of money on the roadbed; the embankments, fills, etc., all become more solid, and more like the earth, originally, before it was disturbed. An old seasoned and appreciated roadbed would withstand the strains of faster trains better than a new roadbed. The increased weight of equipment, loads, speeds, etc., has required considerable change in the standard of construction of the roadbed and its structures, particularly in bridges, rails, etc., and more substantial ballast and things directly affected by heavy wheel loads.

The average speed per hour of freight trains is unbelievably low, because they need terminal facilities, better organization, and more actual energetic management. I believe the average railroad, today, which is not paying returns might very properly pay a very good return if it only heeded a few of the things which are so essential in other kinds of business—efficiency of operation. I am speaking generally; I don't know about the South Shore, and have not seen it in many years.

991 COOLEY.

Recross-examination.

By Mr. Wykes:

The reason for my answer that, assuming a bridge would be put out of office within a year, it would be right, in making reproduction estimate less depreciation, to carry that bridge at 50%, was this: All structures suffer depreciation. It is the common practice to figure the depreciation by the so-called straight line method as distinguished from the sinking fund method, it being simpler. A new property may depreciate steadily, we will say, from 100% to 50%, by the straight line method, and then the curve of depreciation maintained horizontal throughout the remaining years of its use, by applying such repairs to the elements of the structure as will keep it in a 50% contition; eventually, it has to be replaced, for economic reasons, we will say; when it is replaced, then the horizontal line at which it has been maintained for a number of years drops vertically to the scrap value.

I think, without any question whatever, that it is quite the proper thing to maintain the property at whatever percentage it may exist in and can be used in throughout the entire period of its use.

It is necessary to maintain a bridge at some percentage of condition above junk value, to use it and run trains over it. In my practice, I have insisted that all things in use must not be depreciated below a certain point, and they cannot suffer from further depreciation until they are wiped out of existence; this is applied to practically everything. In my understanding, the Master Car Builders rules indicate that it is the opinion of car builders of the country that if a car be roadworthy and proper for use it must be maintained at, say, 40% whatever the per cent is. It is my idea that you must not go below a certain percentage, which represents a safe condition, until after the property is actually disposed of.

992

On December 31, 1913.

F. L. BATCHELDER, a witness called by plaintiff.

Direct examination.

By Mr. Eldredge:

I am Chief Engineer of the Copper Range. I am familiar with the topography of the country west, south and southeast of Houghton, and with the South Shore road, St. Ignace to Houghton, and especially in the vicinity of Houghton. In my judgment, the South Shore right of way, Chassell to Houghton, has a special adaptation for railroad purposes, chiefly from Pilgrim River west to Houghton. Pilgrim River to Houghton, the South Shore occupies the only logical location for a railroad, taking into consideration the cost of construction. Its

entrance to Houghton is on the most easily constructed of any possi-

ble entrance from the south, southwest, southeast or west.

West of Houghton, you run into Lake Superior, about 18 miles away. The Copper Range enters Houghton from the west and southwest, but its location cannot be compared, in cheapness of construetion, with the South Shore; it is one of the heaviest pieces of work yet put in. It is mainly constructed, south of Houghton, through or on a range of hills, for the purpose of serving the copper mines existing or possible south of Houghton. They could have entered Houghton with lighter grade and less work from the east than on the location occupied; a survey was made in that direction.

The next most available line into Houghton and avoiding the right of way of the South Shore, Pilgrim River to Houghton, would lie on the lake side of the South Shore right of way, practically paralleling it. I have not located such a line by actual survey, but by close reconnaissance and by the use of existing topographical maps. An entering line could, and probably would, parallel the South Shore practically the entire distance from L'Anse to Hough-

ton, but it would be a close parallel, Chassell to Houghton. 993 A crossing would probably have to be taken to bring the line to the Lake side between Chassell and Pilgrim River. special adaptation for railroad purposes, Pilgrim River to Houghton Terminal, consists in the fact that it is the most cheaply constructed line possible between those points. The value of such special adaptation may be measured by the difference in cost of construction of the existing line and of the next most feasible line paralleling the South Shore between those points.

I have made an estimate of the cost of construction, exclusive of track material, which we consider equal, and exclusive of cost of right of way. This estimate is based on the possibility of passing in front of the South Shore terminal, and includes to the west line of the South Shore terminal lands. All the elements of adaptability of the South Shore road which I have given apply as far as the west

line of the Houghton Terminal.

Estimated from profile, the quantity of earth between Pilgrim River and the west line of the Houghton terminal we find is 16,000 cubic yards of earth to be moved, which, at an average price of 30¢ per cubic yard, amounts to \$4,800, to which should be added engineering and superintendence of about 5%, or \$240, making a total of \$5,040. On a line approximately parallel, passing outside any existing tracks of the South Shore between Pilgrim River and the west line of the Houghton terminal, we have 37,000 cubic yards of earth, at 30¢, or \$11,100; 2,500 cubic yards of rip rap at \$1, or \$2,500; 2,100 lineal feet of pile trestle,—this estimated trestle was made from soundings and average conditions as I know them around the lake, \$25,275. A small plate girder draw span, to permit seews and tugs to reach a stone trestle of the South Shore, \$12,000; 51,000 cubic yards of earth fill, to be made with steam shovel for replacing trestle of permanent construction, at 15¢, \$7,650; 3,000 cubic yards of rip rap on same fill at \$1.00, \$3,000; 1 mechanical interlocking plant at crossing of line near Pilgrim River,

\$2,000; total, \$63,525; engineering and superintendence, 5%, \$3,176.25; total, \$66,701.25, or an excess cost of this line over the present South Shore line of \$61,661.25. On my theory, the interlocking plant and the engineering percentage on it, \$2,100, should be deducted, making the difference in cost \$59,561.25.

The terminal lands of the South Shore at Houghton have a special adaptation for railroad purposes, which consists in the cheapness of construction of the yard. The South Shore terminal yard at this point occupies a piece of land of suitable area for yard purposes which could be, and was, adapted, in the state of nature to such use, due to the fact that it was practically a flat or very gradually sloping piece of land of suitable area between the foot of the bluff and the There is no piece of land between Pilgrim River and the west side of Houghton, until you are west of the Copper Range yard, which, in the state of nature, could be built into a yard with little expense. The larger portion of the Copper Range yard, which is west of the bridge across Portage Lake, was blasted out of solid rock, and the rock moved out to fill into the lake, and revetments were constructed along the harbor line, to retain the fill. This was the most available place for a yard by the Copper Range road, when It is impossible to state exactly the amount of yardage of earth moved to make the South Shore yard, but indications on the surface at present, from the depth of water in front, the average slope of the ground between those soundings, and the height given on the profile, show the surface of the ground at the center line of the main track at the time the road was built, and from the existing conditions along the shore, wherever a flat of this kind occurs, I state that 30,500 yards of earth work, at 301/2¢ per cubic yard, or \$9,150, plus 5% for engineering and superintendence, amounting to \$457.50, or a total of \$9,607.50, is a conservative estimate of the cost of grading that portion of the yard not already included in my main line estimate.

The next most adaptable land upon which a yard of equal value may be constructed and connect with the line, next most feasible to that of the South Shore, would be the strip lying on the north side of the Mineral Range track and extending from the west end of the South Shore terminal approximately to Portage St., in Houghton. From Complt.'s Ex. 16a, the length of the South Shore yard shows 1,568 feet. The length of this proposed yard would be approximately 2,000 ft.—narrower than the South Shore yard, yet approximately the same area.

To make this strip available for yard purposes, it would be necessary to fill in four different portions of the Lake front and build revetment to maintain the fill inside the harbor line. This filling would amount to 67,000 yards, at 30¢ a yard, or \$20,100; 750 lineal feet of crib revetment at \$50 per lineal foot, \$37,500; total of \$57,600, with engineering and superintendence of 5%, or a total of \$60,480, from which we must deduct the estimated cost of grading in the South Shore yard, leaving \$50,872.50 for the excess cost.

I did not have my proposed line cross the South Shore track and build my yard on the south side of the South Shore track and avoid

all this filling in the lake, because the natural condition of the ground surface over the parallel strip on the south side of the Mineral Range tracks is such that it would render the cost of construction higher than that on the site selected. There would be more earth work and the possibility of striking rock, enough to render the cost of construction greater; if a question of property values would enter there, that would also increase it. The property on the south side of the Mineral Range track is so built up and occupied by manufacturing plants and other buildings that the cost of acquiring the land there would undoubtedly be far higher than on the lake front, where there are a very few buildings.

From the natural conditions along the right of way of the South Shore, and along a possible paralleling line on the route described,

I can see no reason why the value of the property in the state of nature along the proposed line should not be the same as along the South Shore right of way, as the conditions are practically the same. The South Shore line follows a side hill at a short distance above the lake, and in most cases the slope of their fill runs into the waters of the lake, and the parallel line would occupy a practically similar position—it would be either in the water of the lake with its slopes, or directly adjacent to the South Shore right of way, where it crossed already existing lands above the surface of the water. The damage to abutting property would be the same.

It is my judgment that the difference between the cost of construction of my proposed line and of the South Shore is the value of the special adaptation of the right of way of the South Shore between those points, and that the difference between the cost of creation of the yard on the South Shore terminal and upon my proposed new yard site represents the special value for railroad purposes of the South Shore terminal land, meaning the 1,550 feet of water front

to which I have heretofore referred.

In giving the elements that make up the value of the special adaptation of these two parcels of land, I confined myself entirely to differences in the cost of construction. In determining generally in reference to land having special value by reason of adaptation for railroad purposes, it would, in my judgment, be proper to include a capitalization of the difference between the cost of operation of the property having special value and that of any other property which could be obtained to take its place. In case of a yard, it would be difficult to arrive at a definite conclusion; naturally, have to lay out the yard, and figure your switching movements, and comparison of the two yards, and then, from that, attempt to arrive at the additional cost.

997 BATCHELDER.

Cross-examination.

By Mr. Wykes:

Mr. Wykes: I move to strike out the entire testimony of the witness on the ground that strategy of position is not a proper element of value in a rate case; second, because the witness' conception of the method of fixing value of a railroad right of way is entirely improper and fanciful and conjectural and is based upon the conjecture of locating something alongside of this railroad, and in the third place on the ground that the entire testimony and the entire theory is immaterial.

I know of no other railroad seeking an entrance to Houghton, at present, from the east, and have not heard of any such for the last five years. The South Shore, the Mineral Range and Copper Range enter Houghton Village proper. Other railroads in the immediate vicinity have connection with those roads. The Copper Range forms a direct route to points south and west, by connection with the C. M. & St. P.

From the east terminal of the South Shore to Pilgrim River, there is practically no natural level land between the bluff and water, except small points that break out at intervals. The fill or stamp sand that constitutes the tailings from Isle Royal mill, is not natural formation. Today, there is less than half a mile in length along the lake where the level land extends an appreciable distance beyond the South Shore track toward the lake; the bulk of that is stamp sand from Isle Royal mill.

Between Pilgrim River and the east terminal, there are about four places that extend a hundred feet or over from the foot of the bluff out into the lake. Approximately three-quarters of a mile, total dis-

tance, it is a hundred feet or over. The imaginary line I have located was entirely off the South Shore right of way, east of the Houghton terminal. There would be no advantage gained in locating it at places on the South Shore right of way, because where you are not in the water the ground is practically flat. At approximately three places, a total of one-half mile out of 2½ miles, the South Shore road is directly on the face of the bluff.

To make these fills, the material would have to come from the east, the most of it from the vicinity of the Isle Royal mill, about three-quarters of a mile west of Pilgrim River. The track would cross the place where you would get the material. The South Shore has a trestle outside the land portion of their yard, which has been used for various purposes, and it would be necessary, in building a track in front of the yard, to provide an opening to enable them to reach this trestle. If there was no South Shore there, you would be cutting off somebody's right of free access to the channel of Portage Lake, whoever owned the land. There is a draw span where the M. R. and

C. R. cross Portage Lake about 400 feet east of the South Shore yard west line.

The amount I have included for a pile trestle is intended for a pile trestle outside the yard and outside the present pile trestle of the South Shore opposite the Houghton terminal. I should have included the trestle that is there as a construction item in my estimate of what is there and have that as an item of deduction. Mr. Riggs' estimate would be fairer than anything I could give you on that trestle, not knowing the details of construction. The present trestle is about 700 feet long, and, owing to the location of the line, in order to avoid the South Shore right of way, it gives about 2,100 feet. The new trestle I have planned cannot be used for wharf space, as it would be only an ordinary railroad trestle, built for the carrying of traffic by this property, and into a suitable yard on the west.

About 12 years ago, the M. & N. road, which is now a part of the St. Paul system, projected a road into Houghton along that line, but they did not come in. The Copper Range was built about that time. I think at present the land surrounding the South Shore line, between Pilgrim River and the west yard limits, is held in large tracts, or subdivided and lots offered for sale. I do not know absolutely what the ownership along this strip is. I made no investigation. I would consider a strategic location is one that occupied a place where it was practically impossible to put another road by without great excessive cost, and I believe that strategic location to be worth the excess cost to construct a line over some other route.

(Government chart of Portage Lake marked Defts.' Ex. 42.)

I have never surveyed a railroad route in any direction into Houghton. I have in my office the record of all the surveys made by the Copper Range. I am familiar with the topography of that part of the country. It was not absolutely necessary for the C. R. to take the route it did; there was, before construction of the C. R., a line run casterly passing near the cemetery, shown on Defts.' Ex. 42—a 1% line, as I recall it.

BATCHELDER.

Redirect examination.

By Mr. Eldredge:

In building a substitute line, I don't see how you could use a portion of the ground occupied by tracks of an already existing line. If we did use a portion of that line, instead of building the pile trestle in front of the yard, it would cut the South Shore off from the water entirely, and from any use of the water front, except you provided an opening in the trestle.

I read the testimony of Mr. Riggs in this case referring to a substitute line, and made a hurried examination of the same ground that was covered by his testimony. Assuming that a right of way in front of the property of the South Shore could not be obtained,

there is no more feasible route than that of Mr. Riggs. The Milwaukee & Northern road, in their proposed line into Houghton, took a route in the water substantially the same as mine, and to a point beyond the South Shore terminal, at which point they proposed to cross Portage Lake on another bridge. That survey was long after the South Shore had occupied this property. The surveys were made in 1892.

BATCHELDER.

Recross-examination.

By Mr. Wykes:

I have never been called to testify in a case of this kind before. I never heard of anyone who applied this method of valuation of a railroad right of way before. The first details of it came to me either through Mr. Riggs' testimony or through conversations with Mr. Eldredge. I have made estimates of this nature for construction pur-

poses.

The substitute yard I have provided gets you up a short distance closer to the business part of the village of Houghton-about 6 blocks from the bridge crossing the river. The freight house and other facilities would have to be located at the east end of the yard, to have sufficient room for them outside the M. R. tracks. Your work tracks would be closer to the business portion, but your freight house and team tracks would not be materially nearer. There is no possibility of locating another track through the South Shore terminal on the water front, without interfering with existing tracks. There is a possibility of locating a line across the face of this cut, on the south side

of it-the ground covered by Mr. Riggs, in his testimony. It could be located on the water front, and only cross freight tracks, but, if you were going to capitalize the cost of operation spoken of here a few minutes ago, you would have an enormous sum to add, to cover that; run one railroad yard through another and attempt to do your switching, and it would cost you a nice sum to cover

that. It would practically ruin the other yards.

BATCHELDER.

Redirect examination.

By Mr. Eldredge:

I never had any consultation with Mr. Riggs about this matter; this investigation was done entirely by me. In locating work, the engineer always takes into account the relative cost of construction, as well as the cost of land, and the total cost of both is the controlling factor. An engineer must endeavor to strike the proper balance between the two that would give the cheapest road.

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On January 8, 1914.

HENRY R. HARRIS, a witness called by plaintiff.

Direct examination.

By Mr. Eldredge:

I am General Manager of the L. S. & I. and the M. M. & S. E. Ry. Companies. I know the trackage rights of the South Shore in Lake St. in Marquette, described in items 4 and 25, Marquette County, of Compit.'s Exhibits 1b, Riggs, and 1c, Riggs. The tracks are well situated for taking care of the business, and in a good location. cash value of the right of the South Shore to occupy that stretch of land is about \$30,000, in my judgment, based on the value of the land and what it would be, for the advantage a railroad would have, to have tracks located on the property. It would be worth that sum to (Subject to objection as incompetent and irrelevant.) A railroad company could afford to pay that amount for the right to use the tracks there. The M. M. & S. E. could afford to pay, presently, that price for those rights, which would be a value to it on account of furnishing facilities for obtaining business that we do not now possess. We have only a right of way in Lake St. for a single track road—a 13 or 14 foot right of way. We have no place to meet trains, in the whole width of Lake St. approximately three miles in length.

The track owned by the South Shore is between our own main track and the lake, so we have no opportunity to reach the shore line within the harbor limits, and it would give us additional earning power if we could have that space now occupied by the South Shore track, and it would aid us in handling our trains if we could have another track parallel to ours wherever required.

Our passenger and freight houses are north and east of Washington Our passenger location is bounded, south by Washington St. and cast by Lake St., with a street between our passenger station and the

Next to our main track is the South Shore, Lake St., 1003 track. Beyond that is a space 150 feet wide, along Lake Su-Part of that is on the same grade as the street, and part on the level of Lake Superior.

With the South Shore track out of there, we could have a yard of four or five parallel tracks, which it is now impossible for us to ac-This track of the South Shore in Lake St., from Washington St. easterly, would form part of that yard; I consider that in fixing its In my judgment, that trackage right would be more useful to the South Shore than to our railroad. It is the inside track between the street and the harber limit. The fact that the 4,000 plus feet constitutes the main line of the South Shore from the east has a great bearing on it.

HARRIS.

Cross-examination.

By Mr. Wykes:

I included, in the value I fixed, that part of the trackage right occupied by the South Shore main line. If we had that, it would break the South Shore line in two. The L. S. & I, is west of the South Shore tracks, south of the Standard Oil dock. If we owned to the water there, we could make yards down there, by filling the bay. The South Shore track from Washington St. northeast is used as an interchange track with our road, and sometimes for storing cars. There are no industries located upon it.

Assuming this trackage right is merely an easement, and that the city can order the tracks off at any minute, I would give it the same value as I have, on the assumption that they won't order it off. In fixing this value, I took into consideration, to a certain extent, the value of the land that belongs to the city occupied by the track. If

a person had the use of that land, it would, to all intents and purposes, be his property. I don't think there would be any difference between the use of that land and the use by a street railway of land in the streets of Marquette. I never valued a street railway, or thought of the valuation of these trackage rights in that

The L. S. & I was built in 1896. From the beginning, accounts of cost have been kept, so it would be possible to ascertain the original cost of that railroad today from the books of the company. There is about 26 miles of main line and approximately 15 miles of branches. The road runs through practically the same kind of territory as the South Shore. The M. M. & S. E. was started in 1901 and put in operation in 1902. The original records of the company show original costs. The road has about 130 miles of main line. We are within three or four miles of the South Shore for seven or eight miles, then spread apart as high as 15 to 20 miles, and then come together again at Munising Jct.

The principal business of the L. S. & I. is ore. The rates are the same as those charged by the South Shore. Our passenger earnings in 1912 were about \$5,000, total, about 1% of our ore revenue. About 10% of the business is freight other than ore, practically all of it coal from Marquette. I have investigated to see whether this ore business on the L. S. & I. is carried at a profit, and decided it was not

at present rates.

The L. S. & I. is economically operated. I testified in the ore rate case in Chicago, and stated that, including all the railroads in the mining district, the entire trackage of sidetracks and branches to serve the mines and stock piles were moved on an average once in 15 years, and that some tracks were moved more frequently. I used that as an element indicating ore costs. That is a material ore cost. The track around the stock pile moves more frequently, which re-

quires special locomotive service to serve the stock pile and 1005 move cars about it. I refer to that as a cost of ore business that did not apply to freight generally. The L. S. & I. is now attempting to secure an increase in ore rates, due to my belief that, under present rates, there is no adequate profit. There was no net profit after payment of taxes in 1911—a low tonnage year. I could not recall 1910. I should say there was a small profit. There was a small profit in 1913.

I have no authority, without action of the Board of Directors of my companies, to purchase this Lake St. right of way, or agree on a price for it. I think the facilities of the L. S. & I. at North Marquette for ore dock purposes will answer its needs for a good many years.

HARRIS.

Redirect examination.

By Mr. Eldredge:

The South Shore is so constructed through Lake St. that there can be no use for street purposes of that part occupied by the South Shore, which differs from a street railroad. The use by the L. S. & I. and South Shore of the parts of Lake St. that they occupy is exclusive. The Munising road was started in 1895, and completed, as far as

Little Lake, in 1897. It is about 70 miles long.

In my testimony in the ore rate case, I stated that the L. S. & I. was an unique railroad, built for the ore business, and not — be compared with any other road in the U. P., that it did a very small freight business, that its passenger business was inconsiderable, and that there was no possibility that its general freight and passenger business would be greatly increased. I said there ought to be charged to operating expenses a sum which, within the life of the mines which that company serves, would absorb the entire cost of the road.

I believe we are in an entirely different position than the South Shore or the Northwestern roads. Our road showed a profit in 1897, 1902 and, I think, in 1907. In 1911, we did not show a profit, and in 1912, we did not show as much of a profit as in previous years. The only year that I remember right now where the amounts received for transportation were less than the expenses of operation, as per the I. C. C. classification, was 1911, which was a year of light tonnage. I think 1908 there was a loss, as we had light tonnage. In all the years except 1908 and 1911, we showed a profit above operating expenses, taxes and such depreciation as was charged. Our rates up to 1911 were 32¢ a ton, and after that 25¢. They are now 30¢. We have put in a 5¢ increase, and the question of its legality is at issue before the I. C. C.

I was called as a witness in the ore rate case to defend this increase in the rate, and I assume that, in addition to the ordinary depreciation charged by our company in its book of account, there should be taken in sums which, within periods of time that I gave, should amortize the entire cost of the property. I figured on branch tracks to mines being replaced in 15 years, and main line in 33 1/3

years, so that there should be added to the expense of the ordinary operation such a sum per annum as, amortized, would at the end of 33 1/3 years take up the entire cost of the road. All the figures I used in the ore rate case include the replacement of the property by the time the property was worn out. Included in the figures were actual costs, but the results arrived at were an argument.

HARRIS.

Recross-examination.

By Mr. Wykes:

The testimony I gave in the ore rate case was sworn testimony. It was my purpose to give the true state of facts, so far as I furnished figures not stated to be estimates. With the L. S. & I., in this peculiar situation, it must make the cost out of its ore busi-

ness, and carry it at as much profit as it can reasonably get, and at as reasonable cost as is possible. Prior to Jan. 1, 1913, we charged no depreciation on our ore docks. The only depreciation in our reports to the State is depreciation on rails (for the past two years), equipment, and ore dock, since 1913. I should say the L. S. & I. road was as well adapted to carry ore business as any other railroad in the community.

HARRIS.

Redirect examination.

By Mr. Eldredge:

I do not think the State has ever issued positive instruction about the charge for depreciation. The I. C. C., in 1907, issued instructions that depreciation must be charged on equipment, but it left the rate to the railroad company.

1008

On January 27, 1914.

STEPHEN WOOD, a witness called by Plaintiff.

Direct examination.

By Mr. Eldredge:

I live in Marquette. I am, and have been, freight conductor 18 years; on South Shore, 10 years freight, and passenger some; I ran extra passenger about a year—within the last year. I am now local freight conductor between Marquette and Houghton, on Nos. 33 west and 34 east, one way each day, six days a week; the schedule time of 33 is 11 hours and 30 minutes, and of 34 is 11 hours and 25 minutes. I go on duty 30 minutes before leaving time; in that 30 minutes, I and my crew do braking, couple on the engine, couple up and adjust the air, while I, myself, take the numbers and seals

of the cars, and check them with the way bills. Trains 33 and 34

are local freights.

The duties of a local freight are to do all the station switching, load and unload package freight, deliver loaded and unloaded cars to connecting lines and industries, and pick up cars from transfer points and industries. In my judgment, about 50% of the time of my run, on an average, excluding coaling, taking water, and delays by meeting other trains, is devoted to station and transfer switching and loading and unloading freight.

Wood.

Cross-examination.

By Mr. Wykes:

The passenger conductor also takes his train 30 minutes before taking it out. My compensation is on hours; we get paid by the

miles if they exceed the hours.

Nestoria is the only coaling station between here and Houghton; that would take practically only 15 minutes to coal in. We make five stops for water from here (Marquette) to Houghton; sometimes we run by some of those tanks; as a general thing, in bad

1009 weather, we take water pretty nearly everywhere. At Negaunee or Ishpeming, Michigamme, Herman, L'Anse and Keweenaw Bay, we take coal and water right on the main line. Passenger trains generally take water twice between here and Houghton—at Michigamme and Keweenaw Bay; they don't take any coal,

Marquette to Houghton.

I have never had a regular time freight run; I have made runs from Marquette to Thomaston—a few trips—on time freight; that freight would take coal at Nestoria and Ewen, and water at Negaunce, Champion or Michigamme, Vermilac, Trout Creek, Ewen and Lake Gogebic. I have had a passenger run from Marquette, through Thomaston to Duluth. That train would take no coal between those points, but would take water at Humboldt and Vermilac; it might take water four times, Marquette to Thomaston, depending on the engineer and weather conditions. I have been on all the passenger runs on the road.

No. 7 leaves Marquette 11.45 P. M. The switching for that train consists of a sleeper being taken off and another put on at Nestoria, concuming about 15 minutes; that is all the switching that is done.

No. 8, from Duluth toward Marquette, takes off and puts on a sleeping car at Nestoria, puts on a dining car at Marquette, and takes off a sleeper at Soo Jct. That is all the switching done.

There is no switching in connection with taking off the sleeper at Soo Jct; just got to stop, cut your car off over the switch and pull in; it is done by train crew. The dining car at Marquette is put in by switch engine. The change at Nestoria is made by the crew that runs from Nestoria to Calumet. There is no switching done at the Soo for No. 8. If we get into the Soo in time to turn the train and make connections, we turn it; if not, we go straight

to the depot, and it is turned by the switch engine; it would take them about 30 minutes to turn it and bring it back to Soo station.

I have been on passenger runs, Marquette to Houghton 1010

and Calumet, and Marquette to Mackinaw.

No. 1, Marquette to Houghton, does no switching. No. 3, Marquette to Houghton, leaves with two coaches and a baggage and mail car, sets out the day coaches at Negaunee, and backs on to Northwestern train that they take out of Negaunce; then they set

out a dining car at Summit.

No. 4, Houghton to Marquette, picks up the dining car at Summit, delivers the train, except the combination mail car, to the Northwestern, at Ishpeming, and couples on the two day coaches for Marquette that she brings up in the morning on No. 3; to set the diner in or out at Marquette, covering the full delay and getting the train under motion, takes about six minutes.

The cars turned over to the Northwestern on No. 4 include baggage, smoking car, chair, sleeping and dining cars, and at Ishpeming it takes an average of about 15 minutes; there is no switching on No. 2, and no switching at Marquette on No. 4. No. 4 goes back as No. 3; I have never noticed them turning it around; it goes out on the south track, and it is not necessary to turn it.

The passenger trains spoken about, running to Houghton, all go to Calumet, and lay up there; they are not at Houghton more than about 10 minutes, to transfer baggage, mail, etc., and discharge and load passengers, standing on the main track while there; no passenger train now lays up at Houghton. I do not know of any South Shore passenger trains that take sidings at Houghton, except possibly to pass other trains now.

Trains 43, Soo to Soo Jet., and 14, Soo Jet. to St. Ignace; on 43, no switching is done until you get to Soo Jct., when sleeping car off No. 8 is picked up, the train becoming 14. No switching is

done between Soo Jet. and St. Ignace; at St. Ignace, no switching is done, except switch engine couples on to back end of train and shoves it onto the boat. It takes about 15

minutes to unload and get the baggage off at St. Ignace and to cut our engine off and shove the train out; that doesn't cover all the time to chain the train to the boat, at times; it depends on the weather; if weather conditions are bad, and sea heavy, it takes 25 to 30 minutes to chain the train down, because they take no chances.

Train 15 runs — St. Ignace to Soo Jet, and 44, Soo Jet. to Soo. The train is on practically one track on the boat; if there are no extra cars, the regular locomotive backs down, hooks on to it and pulls The only switching between St. Ignace and the it to the depot. Soo is laying out the sleeper at Soo Jet., to be taken by No. 7.

No switching is done at the Soo; you pull right down to the depot, cut your engine off, and that is all there is to be done; the train is taken to the wye and turned by the switch crew, and is

ready to be taken out. On No. 7, through to Marquette, the only switching is picking up the sleeper from No. 15 at Soo Jet. That is all of the switching

that is done by that train before it gets to Marquette; at Marquette, there is no switching, except to cut off the diner; sometimes this is done in lower yards; but it is generally cut off down at the passenger depot; you back in and leave the dining car right there; there is no switching done to it.

On No. 8, Marquette to Soo, there is no switching, except the

e::change of sleeping cars at Soo Jet.

On No. 2, Marquette to Mackinaw, there is no switching done, except at Marquette; they gas the train, which is piped to the car, where it stands, in front of the station. It gets a Detroit sleeper

at Soo Jet., and the switch engine puts it on the ferry in

1912

the same way we do No. 14.

No. 1, St. Ignace to Marquette, is on two tracks on the The road engine couples on to the train on one track; backs onto the balance of the train on the other. This train carries a sleeper, which is delivered to No. 18 at Soo Jet. Soo Jet. to Marquette, including getting out of Marquette going west, no switching is done, unless they have an extra car to set out.

No. 18 connects with No. 1, and runs from Soo Jet. to Soo; no switching is done, except it receives the sleeper at Soo Jet. It comes back as a mixed train, carrying baggage car and one coach to Soo Jet. As a mixed train, that has a combination baggage and smoking car and a first class coach, and an average of 12 to 15 freight

ears; that runs without switching from Soo to Soo Jet.

On train 5, west and 6 east, Michigamme to Duluth, the only switching in Michigan is turning the train at Nestoria, done by the

road engine, and consuming about 15 minutes.

I have been on the other local freight trains than 33 and 34; on some locals, considerably more than 50% of the time was consumed in switching, and on some less; it depends on weather conditions. I don't know as there are any much less than 50%; I fix that as an average for 33 and 34.

I have run on freight trains on all the divisions on South Shore: the business is heavier east of Marquette than west of Nestoriaquite a bit heavier. The freight business is lighter to Houghton

than on the Western Division.

My last answers related to my experience on trains 33 and 34, and not to the general traffic of the Western Division, because I have not

been running on it.

1013 Train 33 would leave Marquette at 7:30 A. M. No switching would be done there by the road crew, as the train is made up by switch engine, which puts the train in station order, the through cars and merchandise cars on the rear end, and cars for different stations in station order; that is all done at Marquette. The cars that make up that train were in different parts of the yard, and the switch engine assembles them and makes them into a train.

Q. About how long would it take to make up that train, assuming

17 cars?

Mr. Eldredge: If you don't know, say so; if you don't know, say

A. I have never worked in the yard, so I couldn't say how long it

does take them to do it.

I have been around the yards; they get their cars in different parts of the yards. They have got a transfer up here that they get merchandise from; they have another place down in the yard where they get merchandise. Where they get their cars from different tracks, it would take one and one-half to two hours to get the train in shape. Some of those cars would be in the south yard, and some in the west yard; it is about a quarter of a mile from where they get those cars, at the passenger station, down to where they make up the train. Occasionally, they get a car out of the west yard, toward the shops. In arranging those cars in the train so as to get them in order, it takes the use of three or four tracks; those tracks are additional to those that the train has to use to go and get those cars and bring them to that point; they get them from different points and bring them in here and switch them.

Train 33, going west, would first stop at Eagle Mills to pick up cars for Houghton and Western Division, and local cars from

Negaunee and Ishpeming; that would take you possibly 15 1014 or 20 minutes to get them picked up in the condition you want them in the train; under normal conditions, you would get away from there in 20 minutes from the time you stopped. Negaunee, you have to let a couple of passenger trains go by, if you get out of Eagle Mills ahead of them, which you would not do if you used 20 minutes to pick up those cars; if you consume 20 minutes at Eagle Mills, they would get by us there; we would have to get out of the way.

Assuming we met the passenger trains at Eagle Mills, we would go to Negaunee, set out cars there, if we had any, pull up and unload merchandise, take water, and pick up any cars to go west; that would

take about 25 or 30 minutes.

At Ishpeming, the next station, we would pull in, set our cars for Ishpeming anywhere we can get rid of them for the switch engine; the engines work together there, the switch engine doing what she

We go through with those switching operations at nearly every station; some of the cars are full when we get them at Marquette; they come from different places; some are made up at Marquettereferring to merchandise cars. Some of them come from the east, from Mackinaw, across the Straits, some through the Soo, some from Marquette; of those we get at Ishpeming or Negaunee, some come from Chicago and south, and of those we get at Nestoria, some of them come from west of the state line.

WOOD.

Redirect examination.

By Mr. Eldredge:

In describing the switching of passenger trains, I referred to the normal or regular conditions, where the train ran without extra cars. On occasions, trains have to be switched more or less at important stations, for taking out of cars put in for a

special service.

The tracks mentioned at Marquette, from which cars would be taken to make up a train (33), did not cover all the track from which cars might have to be switched for that train. The cars for the local freight come from different tracks; they might have cars from the D. S. & L. transferring, or from industrial tracks. I meant they got the freight cars from practically all the tracks at Marquette.

When I said I did not know all of the switching required or time required to make up my train, and get the cars into the train, that is true. I do not know, of my own knowledge, all of the switching re-

quired to assemble the cars in trains 33 and 34.

WOOD.

Recross-examination.

By Mr. Wykes:

I have talked with Mr. Eldredge in regard to my testimony in this case, Mr. Lytle, Mr. Houck and Mr. Tracy being present; other train conductors, Duroucher, Ryan, Wiseman and Hager, were present, and we talked over the conditions and things; we talked about the testimony we were going to give with Mr. Eldredge and Mr. Tracy, and nobody else.

Mr. Eldredge talked with me in the presence of these other train-

men, and talked with them in my presence.

1016

On January 27, 1914.

DIAS WISEMAN, a witness called by plaintiff.

Direct examination.

By Mr. Eldredge:

I am 37 years old, and reside in Marquette. I am, and have been, a freight conductor on South Shore nine years, and in service of South Shore 15 years. I have run extra and local freight, 33 and 34, for about a year, two years ago now; I now run 23, Soo Jet. to Marquette, and 24, Marquette to Soo Jct.; have been running these trains two years. Going east, the trip is made in 11 hours and 30 minutes, and west in 10 hours and 15 minutes; this is a local freight train. We report for duty 1.5 hours before leaving time at Soo Jct., and 30 minutes at Marquette.

At Soo Jet., we make up our train and do our switching, while at Marquette the switch engine does it. In my judgment, about 55% of the time consumed in my run is, on the average the year round, de-

voted to stational service or switching.

WISEMAN.

Cross-examination.

By Mr. Wykes:

My conclusion relates to trains 23 and 24. That switching and stational service involves loading, unloading, switching cars into and out of industries, and taking them over and giving them to connecting roads, both for carload and less than carload shipments.

Not a great deal of the freight we switch comes from other lines; some of the cars come from the Soo, some across the Straits, and some from Soo Line, at Trout Lake; some of the cars through the Soo are from across the river, but the biggest part are right from the Soo. In

the freight going from Marquette east, some comes up from Chicago, and some from west of the state line. On 24, I should judge three-quarters of the freight would be carload

lot stuff, and on 23 probably one-half.

Train 24 would have about 17 cars as far as Evelyn; then they double and handle 32 cars from Evelyn east; the hightest number of cars in that train would be 30 or 32. Out of Newberry, and those places. No. 23 generally has around 40 cars. The principal product out of Newberry is lumber and iron, that goes east, across the Straits. Out of Marquette, east, the freight is merchandise, flour, feed, lumber, etc.

When I stop at a station for switching, or to deliver or take on freight, I hand the station agent the bill, and see that the freight is unloaded; he checks off the bill, gives me way bills for freight he has to load, and I check it in the car; if I have carloads for him, I give him the bills, and if he has any for me, he gives me the bills.

The switching done by 23 and 24 may consist of setting cars for use at industries or at freight houses, and taking them away. We do not register, except at Soo Jct. and Marquette, and we don't need any train orders; we get them once in a while from the operator, who, in most cases, is the ticket agent. The operator is not the agent at Seney, Soo Jct. or Newberry, but the operator sells tickets at all of those places except Seney.

At Wetmore, I do business with the agent and operator, one being there at a time, and I do business with whichever one happens to be there; they both make out way bills and give me what train orders I have from that station. I would find them in the passenger station,

and it is there I go to do the freight busines with them.

At Seney, the man who sells tickets does the freight business too, makes out the way bills, etc.; I find him in the combined passenger and freight depot; I do business with him from trains 23 and 24 in the passenger station. At Newberry, I get orders from the operator, in the passenger station. He sells tickets most of the time; the agent has his office in the freight office there, and the operator in the passenger depot.

and the operator in the passenger depot.

Up to two years ago, I was on trains 33 and 34; at Champion, I did business with the agent, who had charge of both the passenger and

freight depots; his office was in the freight depot. There were five employees there, the agent, two operators, cashier and freight house man. At Nestoria, the man I did business with was in the passenger depot, in 1912. The office at Champion is joint with C. M. & St. P., and these five employees represent both companies.

WISEMAN.

Redirect examination.

By Mr. Eldredge:

A merchandise car would also mean a car loaded full but consigned to different consignees, even though it was not to be delivered locally on my run, as well as a car with package freight.

WISEMAN.

Recross-examination.

By Mr. Wykes:

Wherever we find a passing track at a station, we use it, when necessary, to run our freight train in and get it out of the way so we can do our station switching. Passenger trains make no other use of those passing tracks than for purpose of passing some other train.

1019

On January 27, 1914.

JOHN HAGER, a witness called by plaintiff.

Direct examination.

By Mr. Eldredge:

I live in Marquette. I have been freight conductor on South Shore for 12 years; previously in employ of other railroads. I have run practically all the South Shore freight trains; am now, and have for three years been, running time freights 53 and 54, Marquette to Thomaston, and return. A time freight handles practically all through cars, and occasionally perishable package freight; that is classed, for compensation, as a second-class local, but carded as a time freight.

Our running time west, on actual schedule, is 12 hours, and east 12 hours and 5 minutes. Excluding time for coaling, watering, and delay in meeting other trains, 30% or better of our time, on an average, is devoted to stational or switching service at stations.

1020

On January 27, 1914.

MARTIN RYAN, a witness called by plaintiff.

Direct examination.

By Mr. Eldredge:

1 live in Marquette. I have been a freight conductor on South Shore for seven years; I am now running time freights 21 and 22, between Marquette and St. Ignace, 151 miles. The schedule time on 22 is 12 hours and 15 minutes, and on 21 is 11 hours and 45 minutes. By time freight, I mean we handle no way freight, but through

cars, principally.

We handle some loads and empties not destined to terminal points, picking up and dropping cars. Omitting time consumed in coaling, watering, and delays in meeting other trains, I figure an average of 25% of the time of these trains is devoted to stational work, including switching at terminals. About 1/3 of the freight carried in these trains would be local freight. I have, in recent years, run local freights 55-56, between Michigamme and Thomaston. Exclusive of time spent in watering, coaling, and delays in meeting other trains, in my judgment, 50% of the time of those trains is devoted to switching and other stational service.

RYAN.

Cross-examination.

By Mr. Wykes:

I was upon local freights 55 and 56 to about four and a half months ago. A local freight goes along, and does the station work, and handles package freight; such freight, east out of Marquette, would be cars to some station between here and St. Ignace, without regard to where they came from, originally, to get to Marquette. If it leaves Marquette, destined to some point east on South Shore, it is local, no matter where it originated. Trains 55 and 56 run between Michigamme and Thomaston, averaging 20 cars.

1021 For switching at the station, it may take 45 minutes to two hours; ordinarily, it will take over an hour at Soo Jct. It takes considerable time at Trout Lake, and at Newberry; it might be there 20 to 45 minutes. Still speaking of 21 and 22, we do no other switching between Newberry and Marquette; we may have a couple of cars to set out at Shingleton, taking 15 minutes; a few to take out at Wetmore, 20 minutes. Sometimes if we spend more than our time at a station, we cannot catch our time. We have a speed limit of 20 miles per hour, but sometimes we are delayed, and cannot make up time, on account of the weather.

To stop our train and take a siding, from the time the engineer applies his brakes, to be ready to stop, until we get into the clear,

will take between 15 and 20 minutes; you have to stop to get your switch open, and then start your train up again, and back in; I assume a train of 40 or 50 cars, which we sometimes have; it would take less time with a lighter train.

The average number of cars out of Marquette on 22 is about 20 cars; we pick up down at Evelyn, 45 miles east of Marquette, but do

not do anything until we get there.

RYAN.

Recross-examination.

By Mr. Wykes:

On my last trip west, it took an hour to make Newberry, from Soo Jct.; that occurs frequently in cold, stormy weather. You can go right along with your train in summer, but a car standing on a siding in freezing weather is pretty well stiffened up, and it takes some time to get them warm; it takes more power to get it started—quite a while to get it under motion—when it is standing out, cold.

I don't know any place where the passenger trains stand out

1022 and get cold in that way.

The carrying capacity of trains varies with the different locomotives; our new engines have increased the carrying capacity of trains 60% over the standard engine—the 300 class. The tonnage figures I gave (R. p. 7431) applied to the new locomotives; before we got these new locomotives, the tonnage figures were 60% less.

I do not know the proportion- of freight in 21 and 22 that come into Michigan from other states, and that which originates in Michi-

gan.

1023

On January 27, 1914.

JOSEPH DUROCHER, a witness called by plaintiff.

Direct examination.

By Mr. Eldredge:

I live in Marquette. I have been a freight conductor on South Shore 14 years; am now running time freights 31 and 32, Marquette to Houghton, 94 miles. A time freight handles only through freight, except in case of perishable stuff. Time freights handle car-

load freight only.

Schedule, Marquette to Houghton, is 9 hours, 15 minutes, return 8 hours, 30 minutes. On 31 and 32, taking average for year, excluding watering, coaling, and delays in meeting trains, about 30% of the time is devoted to setting out and picking up cars; that does not include starting and stopping the train. I figure from a dead stop to a start. Depending on conditions of grade, we would begin to stop the train ½ mile from station, and on good track it takes

about $\frac{1}{2}$ mile to get up to normal road speed; it would take 10 minutes to start and stop, assuming 20 mile speed.

DUROCHER.

Cross-examination.

By Mr. Wykes:

It would take 10 minutes to run a mile, reducing, in the mile, from 20 miles an hour to a dead stop and start, and then reaching a speed of 20 miles an hour again. My 30% applied only to trains 31 and 32; that train would coal once at Nestoria, taking 20 or 25 minutes, and take water four times on the road, consuming five minutes, or 12 if you stop purposely; at some places, water can be taken in three minutes. In saying five minutes to take water, I figured three minutes to take the water and two minutes to stop, or maybe seven minutes in coming to tank and stopping.

On 31, we are allowed one hour and five minutes for working Ishpeming, and meeting trains there; that time is allotted to 1024 do work there, and meet trains. On 32, 35 minutes is allowed at Ishpeming; also 25 minutes at Nestoria; those are the only

places shown.

Train 32 is allowed, on schedule, eight hours and thirty minutes for 94 miles, at 20 miles per hour; four hours and 42 minutes allowed in running; that speed is sometimes exceeded. There is almost four hours to get rid of on the way; if you come in on stational service, twice the percentage would not run 30%; that runs up so high only when you lose time.

Some of the cars on 31 and 32 come from Wisconsin; seldom a

car on that line from east of Soo.

1025

On January 28, 1914.

CHARLES E. LYTLE, a witness called by plaintiff.

Direct examination.

By Mr. Butler:

I live in Marquette. I am General Superintendent of the D. S. S. & A. and Mineral Range railways. I am in charge of operation with headquarters at Marquette, and my jurisdiction extends over entire road. I have been been with South Shore over 25 years; 1888 to 1893, Chief Train Dispatcher; 1894 to 1900, Superintendent, since then, General Superintendent. While Superintendent, my territorial jurisdiction was the same as now. During these 25 years, I have been familiar with the operation of the freight and passenger trains on South Shore.

The classes of regular freight trains are: Local freight, or way trains, through or time freights, and extras; the extras run as require-

ment dictates, and are not on time card as regular trains.

Local freights do all the way work—the station switching and the distributing and picking up of less than carload merchandise, package freight.

Time freights do the through business, as a rule, distribute, load

and unload considerable perishable freight.

To a considerable extent, when necessary, when they are not loaded with through freight, the time freights drop out and pick up cars at points intermediate the termini of the run. They lose their number at the end of the division, except two Western Division time freights, that hold their numbers into Marquette, for identification. But the scheme of handling the freight, or connection of the time freight, is continuous—it goes right through, from one end to the other.

No local freight runs over more than one division, except two Western Division locals, running down to Michigamme, seven 1026 miles, to get them to a town where we can care for the engine;

they do not do much work in there.

On Mackinaw division, we have regular local trains, Nos. 23 and 24, Marquette to Soo Junction; also 49-26, Soo to St. Ignace, and 48-25, St. Ignace to Soo.

So far as pay of trainmen is concerned, local freights are the highest class of freight trains; the locals all get the same rate. The crew on local freight, Mackinaw Division, consists of conductor, flag-

man and two brakemen, and engineer and fireman.

Trainmen and enginemen are paid 10 hours minimum; 2,600 miles a month is guaranteed them; that is 26 working days a month. Ten hours or less constitutes a day's pay. The local freight conductor is guaranteed \$117.50, or 4.5¢ a mile. They are paid in miles, if miles makes the highest amount, and paid in time, allowing 10 miles to the hour, if that makes the highest.

All local freight conductors and brakemen get the same rate of pay. Some of our time freights are modified locals; they get the middle class of pay, and the time freight men get the lower rate. The local freight employees get higher pay, because they have more work to do, and more responsibility, as they have more detail work

to do in distributing, picking up and loading freight.

A local freight man is on his feet practically all the time, and a time freight man, a good many times, has an opportunity to sit in the caboose and watch the train. Regular time freights on Mackinaw Division are 21 and 22, St. Ignace to Marquette; also 47 and 46, Soo to Soo Jct.; also mixed train 42, Soo Jct. to Soo.

The local freight spends the most time in work at stations; excluding time necessary for taking water and coal, receiving orders and meeting other trains, about 50% of the time of 23 and 24 and about 55% of the time of 49-26 and 48-25 (all local) is spent by the train and crew at station work. Time freights 21 and 22 spend about 25% of their time in switching, and 46 and 47 about 20%.

My means of knowledge on this subject is personal observation. I spend more than half the time, as a rule, on the road, and have since being Superintendent and General Superintendent. There

is no absolute record, to show the amount of stational work and running time between stations; the train sheets show the time only

at telegraph stations.

Many times the train is late, or a night train, and the operator, who informs the dispatcher where the train is, is not there. train sheet always shows the departing and arriving time at telegraph stations; the sheet would not show absolutely whether the delay was due to waiting for a train or to switching work; you would have to have a knowledge of the schedule, to figure that out.

I control the making of the time card; the running time has been changed from time to time, to suit the business on the different We change the time cards every spring and fall. no radical change on freight trains, as a rule, unless new business turns up, or we lose business. The business is quite different in winter than in summer. In winter we handle a great many logs and forest products, and in summer we handle a lot of iron ore.

The forest products and logs are switched, taken up and set out by local trains, a great deal, and there are extra trains that handle logs and forest products. The ore over the dock is handled by extra The time freights cast of Marquette are filled out with ore trains.

all rail ore, and, as a rule, it is handled on extra. freights handle the highest class freight first, and, if there is not enough of it, they are filled out with lower class freight; e. g. ore; if this extra capacity of time freight is not sufficient to

handle the ore east of Marquette, they run an extra.

Of the time of No. 42 (mixed train), 20% is spent in stational work. The crews report before leaving time, and are paid for the There is also a time allowance, and pay after reaching extra time. destination.

A good many of the trains run into time in excess of the card time, being late; of this, the local train has considerable more than the

time freight on all divisions.

The following table shows the pay of trainmen:

- Aumon	Local.	Time.	Extra.	second class.
Trainmen.		\$107.80 71.50	\$107.80 71.50	\$112.20 77.00
Flagmen Engineer (per day) Fireman (" ")	82.50 4.90 to \$5.55 3.10 to \$3.50	4.65 to \$5.30 2.85 to \$3.25		

On Houghton Division, local freights 33 and 34 run from 1029 Marquette to Houghton; 50% of their time, I should judge, is spent in station work, outside of time necessary for fuel, water, passing, and taking orders.

Local freights 55, Michigamme to Thomaston, and 56, Thomaston

to Michigamme, spend 50% of their time in stational work. Time freight 53, a continuation of train 21, on Mackinaw Division, changing crews and engines at Marquette, and running Marquette to Thomaston, and time freight 54, Thomaston to Marquette, spend about 30% of their time in stational work.

Time freights 31 and 32, Marquette to Houghton, spend about

30% of their time in station work.

On Western Division, time freight 63, continuation of 53, with new crew and engine, runs from Thomaston to Superior, and the corresponding train in opposite direction, 64, spend about 50% of their time in stational work (60% for train 63).

Local freights 67 and 68, Thomaston to Iron River, Wis., spend,

respectively, 75% and 60% of their time in Michigan in stational

work.

The time cards do not specify all points where freight trains are required to stop and do work of switching, picking up, dropping out, or receiving or delivering freight. There are many places on the line where such work is required of freight trains, where there are no stations or telegraph offices; these stations are, in the aggregate, sources of a large proportion of the business.

The out tonnage at such stations is always larger than the in tonnage, where they are shipping forest products, but 1030 even the inbound train has to take empties to these same places; it means stop and work, distributing empties; it is a source

of delay in switching, though there may be no tonnage to go.

Train 65 is a continuation of the run of 67, Bessemer Jct. to Bessemer, 1.9 miles; they lose 30 minutes going up there; they don't take their whole train up, on account of the grade; they have what is to go to Bessemer on the head end, cut the train in two, haul merchandise car to Bessemer, unload the merchandise, load any merchandise that is to go, come back down the grade, couple up their train, and pump up the air again.

The extras are always time freight, carload freight, and run as the service requires; if we annul a regular local today and run an extra

in its place, the extra gets the local pay.

The extra and time freight do the switching incident to the train and trip; the local way freights not only do that, but also do the stational switching—all switching necessary at all of the stations where switch engines and crews are not regularly kept. Omitting the extra ore trains, about 25% of the time of extra trains and crews is spent

in stational work.

The ore trains handle the coal for all the mines from which they get ore, and some commercial coal for Negaunee, Ishpeming and points beyond. The tracks on which iron ore originates and moves to Marquette are used in handling fuel, supplies and materials for the mines; the coal goes in, in the season of open navigation; the mining timber, lagging, and supplies of that kind, for the mines, as a rule go in in winter. There is a lot of mining timber shipped, and the inmovement to the mines and districts about them is the year round.

1031 Our railroad connects with other railroads at different points, as follows:

Place.	Railroad.	
Sault Ste. Marie	Algoma Central & Hudson Bay. Canadian Pacific. Soo Line.	
St. Ignace	Grand Rapids & Indiana. Michigan Central.	
Trout Lake	Soo Line. Manistique & Lake Superior. Munising Railway.	
Marquette	Marquette & Southeastern. Lake Superior & Ishpeming.	
Negaunee	Chicago & Northwestern. Lake Superior & Ishpeming.	
Ishpeming	Chicago & Northwestern.	
Republic	Chicago, Milwaukee & St. Paul,	
Houghton	Copper Range. Mineral Range.	
Chassell	Houghton, Chassell & Southeastern, Mineral Range, A few logging railroads.	

1032 (Objection to testimony immediately following, that the records show the information.) About 5/6 of the tons of freight handled in Michigan by South Shore comes to it, or is delivered by it, at these interchange stations. I am familiar with the physical situation and work required at these points to interchange cars, and in general with the number of cars customarily interchanged at these points.

At Soo, the in-going train pulls into Soo, and sets the train out into the receiving yard; then the terminal switch engine spilts the train up, separates and delivers whatever is local, and another engine takes whatever is through across the river. Most of the interchange business at Soo goes or comes across the river; a little business is interchange between ourselves and the Soo Line. We have a lot of business local to the Soo. The volume of interchange at Soo runs from 40 to 100 cars a day, in; the out business from across the river, in loaded cars, runs 10 to 20 cars a day, plus all the empties that went over loaded.

At St. Ignace, the road train comes in, puts the train on a receiving track, about a mile from the dock. The switch engine splits up the train, separates the local cars, which are later distributed, and takes the interchange through cars to the slip dock and puts them on the

transfer boat to go to Mackinaw City. The object is to keep the boat going, and the local cars are distributed, when they have opportunity, between times. They take the in-bound car off the transfer boat, and nearly all the merchandise goes to the house to be separated, re-arranged, and consolidated by stations and destination, and through cars are made up near the freight house, into out-going trains, by the switch engines.

We have local business to and from St. Ignace, but the interchange business there is very much larger; the interchange there is 1033 running 1,000 to 1,200 cars a week, now. It is a little higher

now than in summer; the interchange business is always heavier during the season of closed navigation; the business is now light for winter. The ins will not run so heavy on loaded carsabout 25% of the out-bound interchange loaded. We are getting large quantities of empties now. There are about 250 in-bound loaded interchange cars a week; the empties will run about the same.

That is for winter. In open navigation, the loaded out-bound interchange will run about 70 cars a day and in-bound about 35. A great many of the in-bound loads at St. Ignace are consolidated by us and made into less loads. We take the in-bound freights from the Michigan Central and G. R. & I., coming to us in separate and mixed cars, and consolidate them into a great many less cars than they give us. Each company may give us half a carload of freight for St. Paul, and we consolidate all that St. Paul freight into one car, at our expense, with the transfer force at St. Ignace, and make one car out of the two. We have a foreman and a lot of men

there, doing that all the time.

Trout Lake is Soo Line interchange. This, at present, I think, runs 25 to 30 cars a day received; this is light for this time of year, but the average for the year is less than that; we give Soo Line at Trout Lake 15 to 20 full carloads a day, average the year round. Four wye tracks connect South Shore and Soo Line there; as a rule, they set their loads on the east wye, for our east bound trains to pick up; we deliver to them on the west wye, so they can get them. That is ordinary business; if there happens to be a congestion, as there has been, caused by ice in the Straits and the boats being tied up, it very soon plugs up. We had everything chock full there a year ago-500 loaded cars set out that we couldn't take in because we couldn't get our boats to working. We aim to keep the Straits open

the year around.

1034 At Shingleton, the interchange is not so heavy; we have two tracks there, both owned by this company, and we set the cars where Manistique and Lake Superior engines can get them, and they set cars on our tracks where we can get them, and when our train comes along we pick them up; this interchange is daily, averaging three or four cars a day, except when they are receiving iron ore at Manistique furnace, when it sometimes runs 20 to 30 cars a day of iron ore.

At Munising Jet., there is a wye from Munising main track to ours. with sidings off it, and everything interchanged there by both companies is set on that siding and we help ourselves. Our east-bound

trains can interchange there readily, tut the west-bound trains go way down onto the Munising track to get at the lower end of that siding, and pick up their cars and set out. The in-bound and out-bound loaded movement at Munising Jet. would not exceed 24 cars a week; we give them a lot of Detroit merchandise, going to Munising.

At Evelyn, we interchange with Munising Railway; there is just a wye track. Seven or eight cars of logs a day, going to Newberry, are interchanged to us the year around; the movement the other way is nothing but empties. Evelyn business is all billed, and we regard

it as Shingleton business.

At Marquette, we deliver to L. S. & I. on Lake St., and receive from them in the east yard. The interchange averages five cars of loaded tonnage a day out and one car in. Every time they ship a car of lumber, though, they have to get the empty from us to load it on.

At Ishpeming, the interchange business is heavy. There is a transfer platform there with C. & N. W. track on one side and ours on the other; they set everything for us on their side, and our train picks it up. We deliver to them on the same track; if they don't

1035 happen to have a train come along to clear the track, the switch engine does it. At night, the road trains help themselves, make their own deliveries and pick ups on the transfers, and in daytime the switch engine does quite a lot of it. The volume of interchange at Ishpeming would run 20 cars a day each way.

At Republic, the volume of business interchanged is small, hardly a car a day, there is a wye track from our line to C. M. & St. P. At Champion, our track parallels the St. Paul; everything we have for them we set on their track, and everything they have for us they set on our track; I don't think the volume averages over 10 cars a day each way.

At Michigamme, I don't think the interchange averages one car a day, but within the last six months quite a lot of telegraph poles, off our Western Division, were delivered to C. & N. W. there.

At Houghton, the average daily interchange with Mineral Range would run 15 to 20 cars west, and lighter the other way; about all we get there is refined copper, which is heavier in winter than in

The other business will run 20 cars a day, in normal condition, off our line, and five cars to our line. At Houghton, the road train pulls in, sets the train out, a switching engine breaks up and distributes the train, and (except train 31) takes across the river whatever goes to Mineral Range; train 31 sets out its own cars at Houghton and takes Mineral Range cars over the river. To bring back the cars for the local freight, we get them at Houghton; for time freight 32, they get most of the Mineral Range cars at Hancock, across Portage Lake. At Houghton, the transfer with Copper Range averages about five cars a day.

1036 At Sidnaw, we now transfer about 25 cars a day; we deliver a great many logs at Sidnaw to C. M. & St. P., going to Oconto, Wis. We get down there with a train of logs, two engines, double header, and set the train over into the St. Paul yard; we

have to go a mile to their wye track and turn around, and go back

with the empties, which they set over into our yard.

We have a short transfer track there, used to deliver one or two cars. If you have 24 cars of logs, it won't hold it, so you have to run that train through, into their yard, turn all the switches, and set it out into their receiving yard; they do the same with the empties; there is no track long enough to hold that many. The present volume is lighter there than in previous winters, except last winter. In addition to logs, there is a little interchange there of pulp wood and forest products.

At Chassell, interchange would not average over one car a day; the H. C. & S. set the stuff on our siding, and we pick it up, and we

have nothing to give them except the empties.

At Keweenaw Bay, the interchange, principally forest products, averages, in winter, 25 to 30 cars a day; there is very little in summer. There is a track on which we deliver to them, and a long siding where they set our cars for us.

(Witness corrects the station switching on train 67.) I gave it as 75%; I think it will run 100% of the running time, and that the

train does fully as much switching as running in Michigan.

On 67, the train will make her run in 45 minutes, but she won't do her work in Michigan in less than an hour and a half. That would be 100% of the schedule time, because the schedule time only represents the time the train is due to leave; it does not

1037 represent the time the crew goes on duty.

On train 47, time freight, I meant 20% of the total time on duty was used for stational work; and the same as to all other

runs.

For business originating on our line in Michigan, the consignor orders a car from the nearest agent; the agent orders the car from the Train Despatcher, by wire, or, if it happens the daily car report goes in, he puts it on that, or he may do both. The train despatcher sends a car, and notifies him what it is for; the shipper loads and bills it, and delivers the shipping bill to the agent, if it is an agency When the train comes along, they stop and switch it into If it is an agency station, the agent bills it. not an agency station, the conductor lifts the bill, left by the shipper, issues a conductor's bill, and leaves the shipping bill with the first agent in the direction in which he is going, and the agent makes a regular bill, which goes with the conductor, or follows him to the final destination. That bill is called the freight way bill, and a copy goes to the auditor. If it goes to an agency station, the freight is to be collected at destination, and, if to a non-agency station, the freight has to be prepaid, or, if it is a regular customer, and credit issued, to the next agent beyond where the freight goes, where the way bill is filed, and collected weekly.

The locals mostly set out the empty cars for loading at point of shipment. The time freights set out some, but, as a rule, they set them out in bunches, and the locals spot them as they come along. The time freights do very little or no placing for loading, unless it is perishable freight. Most of the picking up is done by the local freights, or extra trains out for that purpose.

In Marquette, we keep two switch engines at work days and one nights, in winter, and, in summer, from three to six, days, and two,

These switch engines spot the cars for loading, and pick them up and assemble them into trains after they have been loaded at stations where we have switch engines; switch engines are regularly kept in service for such work at Sault Ste. Marie, St. Ignace, Marquette, Negaunee, Ishpeming and Houghton.

Q. Describe the stational service at the point on your own lines

where shipments are delivered to the consignees?

A. Well, a shipment comes in for a consignee; in the first place, he has to be notified that it is on hand, and that is done either by postal card or usually by telephone, if it is in a town of any size where they have telephone service; and he gives the disposition of it, where he wants to unload and when, and the car then has to be placed for him to unload. Of course, the expense bill has to be made out and taken from the way bill and any corrections used, it may be totally wrong or some clerical error that has to be looked after and seeing that the right rating is used and the expense bill written and corrected, if necessary, and if the consignee has a weekly credit, why, he gets his freight and settles once a week, and if he don't, he has to settle for it before he takes his freight, and then his car has to be placed for him to unload, and he unloads with a team, as a rule, if it is a carload, and then after it is unloaded there is another movement, to pick up the car and dispose of it. If it is an agency station he usually asks the train despatcher for the disposi-In case the same agent did not want to load it out again, which is not frequent, but even if it did, that generally has to have a move to get it out to some other point, at the point of origin, to load and if it is not wanted to load out then the train despatcher tells him where to send it to get a load, or, if no loads are in sight, if it happens to be a foreign car, to send home.

Carload freight is not accurately checked; less than carload freight is always accurately checked. Of the total tonnage, in Michigan,

of all kinds of freight, I think about 4% is less than carload. Q. How is the less carload stuff received on your line in 1039

Michigan?

A. If it is at a freight station, the shipper brings it to the station, and the agent issues a receipt for it and takes it; he takes it and issues a receipt and checks it, and the train comes along and he has it on the platform and when the local comes along the local crew loads it into a car. If it is at a large station, such as Marquette, St. Ignace or Sault Ste. Marie, the station forces load.

Q. Is the car spotted at the house?

A. Spotted at the house and loaded by station order, and when they came to it on the local train in the morning, the freight for the first station is supposed to be next to the door, and so on, until the car Then the same crew will probably keep loading into that car at points beyond, as they came along, at the stations. the station where there is no agent, and they are flagged for less than carload shipment, there has to be a shipping bill with it just like a carload. They stop and load it, and sign the duplicate way bill.

Q. How is the delivery at destination to or for the consignee, on

your line, handled?

A. If it is at a large station, the car comes in, in the train, and the switching engine switches it to the house. The house hands unload the freight into the warehouse, and make out an expense bill from the regular way bill. They notify the consignee by postal card, generally by telephone if it is in quite a sized town, the freight is there and for them to call and get it. He sends his wagon, and, if he has a credit account, why, he settles his freight once a week, and if he

don't, he pays for it before he gets the freight, and he loads

1040 it then into his wagon.

Q. Is this manner of delivery followed without regard to

whether such shipments originate on your line or elsewhere?

A. The delivery is followed the same way; it is just as much trouble to deliver a foreign shipment as it is one of our own.

Q. And the same so far as loading, for a foreign shipment, as it is

if loaded for a local shipment on your line in Michigan?

A. Yes. Now, in regard to delivering less than carload freight to non-agency stations, the train stops at the station, and if the consignee is on hand, there, to get his freight, it is unloaded and checked out to him, and he signs the way bill, acknowledging the safe receipt of it, and if he is not there, unless he has filed authority with us to unload his freight at his risk, then that conductor has to carry that freight to the next station and put it in the care of the agent, and the next day we have to tote it back and try to find the man to get him to sign up for it. We never found it safe to deliver less than carload freight at non-agency stations, without receipting for it; it always results in a clash, if we do.

The amount of service per ton at interchange points averages 25% of the single full stational service, where the shipment originates or

terminates on our line.

Shipments originating and delivered to consignees on our line in Michigan receive two full stational services; shipments originating on our line in Michigan and delivered to other carriers at Michigan junction points receive 1.25 full stational services; freight originating on our line in Michigan and carried into Wisconsin receives but one terminal service in Michigan; freight originating on our line in Wisconsin and delivered to consignees on our line in Michigan receives one terminal service in Michigan; freight originating on our

line in Wisconsin and delivered to other carriers at Michigan junction points receives 25% of a full terminal service in Michigan; freight received from other carriers at Michigan junction points, to be delivered to consignees at Michigan stations, receives 1.25 full stational services; freight received from, and delivered to, other carriers at Michigan junction points receives 50% of a full terminal; freight received from other carriers at Michigan junction points and carried into Wisconsin receives 25% of a full stational service in Michigan; freight received from other carriers at Wisconsin junction

points and delivered to consignees on our line at Michigan stations receives one full terminal service in Michigan: freight received from other carriers at Wisconsin junction points and delivered to other carriers at Michigan junction points receives 25% of a full stational service in Michigan.

The stational service at point of origin comprises about the same number of moves as stational service at point of delivery. I never was able to get any figures on the cost; it would cost about the same.

On carload shipments, the cost of originating on our line is about the same as cost of delivering to consignee on our line; on L. C. L. shipments, the time of originating a shipment is a little more than the cost of delivery. On carload shipments from other companies, we ordinarily take the originating line's weights.

Trains 28, 29, 35, 36, 37 and 38 are not time freights; 40% of their

time is spent in stational work.

1042 LYTLE.

Cross-examination.

By Mr. Wykes:

On a carload shipment originating on Fiborn Quarry branch, our locomotives on trains 28 and 29 would do all that quarry branch work. Time freights do not go into the quarry; that would be a local freight, though the scale of time is the same as a time or extra freight. In estimating the time spent in stational work on the quarry train, I consider the time running into the Fiborn Quarry from main line as stational work; the 40% spent in switching includes the time in going into Fiborn Quarry. I think mileage made on Fiborn tracks enters into our revenue train mileage, but do not know.

A carload of freight originating on Peninsular Bark & Lumber spur would be brought by the Soo switch engine. A car originating on Bay Mills branch would be taken out to main line by No. 49's engine; that is a local freight. After it was on main line, the same engine would take it along, if going west; if going east, they set it

out for local 48, to take in.

A car originating on Fuller branch is taken out to main line, 1.5 miles, by engine of local, 49; if it was going west, this train would take it along; if going east, they would set it out at Strong's, and 48 would take it along. On See Why branch, engine would take it out and bring it to Hulberts, where they would set it out for east bound, if going east.

A car originating on asylum branch, Newberry, is taken out by engine of local 23; if it is going west, they take it with them; if it is going east, they set it out for 24. On the branches so far men-

tioned we get nothing but carload shipments.

A shipment originating on Northern Cooperage Co. branch is delivered to us at McMillan, by L. S. I. & C. Co. At Danber 1043 branch, the L. S. I. & C. Co. run their engine on our track nine miles, Danber to McMillan; they pay no compensation for use of our tracks. A shipment originating on Danber branch

is delivered to our main line by L. S. I. & C. Co. engine.

All the branches in Marquette are served by our switch engine. Where a shipment originates on Negaunee and Palmer branch, the Negaunee switch engine goes after it. The Negaunee old mine is obsolete, though the tracks are still there (.80 miles). The old Mary Charlotte mine has been obsolete for two years; the track is still there, but not actively in use. Teal Lake branch is open; it runs to Lillie, Hartford and Cambria mines; we deliver coal to gas company on coal trestle there. This branch is serviced with the switch engine from Negaunee,

We have an active track to Lake Superior Pit No. 7; they ship ore. The Lake shaft branch (Lake Superior) has been obsolete three or four years. The Cleveland Lake branch is an active shipper. The tracks to the mines around Ishpeming and Negaunee are served

by our switch engine.

The Winthrop branch, three or four miles out, is served by switch engine. The American Mine is served by local freights, going in to deliver merchandise, and handling ore shipments, by extra crews. Most of their steam shovel spotting is done by Ishpeming switch engine.

For commercial work, the Champion mine branch is served by local freights; the mine is not shipping; neither is the Webster

mine.

From the L'Anse merchandise dock track, we get heavy shipments of telegraph poles. Local train 34 would go after a shipment originating on merchandise dock track at L'Anse; if it was going west, they would set it out on the track at the station for local

west, they would set it out on the track at the station for local 1044 33 to pick up; as a rule, the local going east would take it along, but as this is at the foot of the 3% grade and many times they cannot haul it, the time freight might take it. If it was

times they cannot haul it, the time freight might take it. If it was a shipment out of L'Anse for Marquette, or a point east, the local would bring it to Marquette; from Marquette to St. Ignace, assuming that as its destination, it would probably be carried in time freight 22; it becomes a through car on the Mackinaw Division, and we are anxious to make time with it. The same operation would occur with a shipment from the mill track at L'Anse.

If a shipment originated on one of these tracks at L'Anse, to go on to Western Division, the local would take it to Nestoria; then, if going west of Thomaston, the time freight would get it; if going

east of Thomaston, the local would get it.

On Baraga mill track, the engine of local 34 does most of the work. On Paquette mill track, the locomotive of local 55 would take the shipment coming out of that track, if going west, to Thomaston; if going east, they would set it out at Covington, for the east-bound local to haul into Nestoria, saving the time freight a stop there. If it was going to Marquette, it would go from Nestoria on time freight 32 or 54.

Shipments from Trout Creek Manufacturing Co. track would be taken out, and taken to the end of the division, at Nestoria, or Thomaston, by the local (56); at those points, they would be set out for

time freights.

On the Weidman spur, they have their own engine; we do not

run in there. We haul them many logs on local, and get the bustness after the logs are sawed into lumber; we have to switch the lumber cars into their yard and then go after them; this is a stone's throw from the track. Our local train switches them out and carries the cars to Thomaston on west, or Nestoria on east, when they

go into time freights.

logs for Trout Creek; our engines, of extra logging train, run into Baltimore branch, six miles, for logs; this extra runs between Ewen and Sidnaw. Just now, that engine switches at Jensen Mills; they haul 15 or 20 cars a day of logs from Jensen Branch to Ewen, for Jensen mills. The products from Jensen Mills come to our track at Ewen and are picked up by the locals, time freights, and extra; that is right at the foot of a hard pull, and the tonnage out of there is not heavy; it depends upon what train can pick it up best. The locals, as a rule, cut down there, to get ready to do work east; you have to keep throwing extras in there, to get out the accumulated tonage.

The Bergland branch is served by locomotives of local 56, which goes in 2.8 miles to the end of branch. If shipment is for Bergland mill, it spots it there; we have to take it back about one-eighth of a mile and run in on the mill branch. The lumber from Bergland Mill is taken out by local 56; assuming it goes east of Marquette,

the time freight would get it at Nestoria.

At Thomaston, there is no switch engine, and the trains coming in set out their train, and, as a rule, it goes through on the same, class of trains, west or east; if it is east-bound freight, it all has to be made up into new trains. Coming east, the tonnage out of Thomaston is much heavier than that into it; i. e., an ordinary freight engine will haul 550 tons into Thomaston from the west, but from the east they can haul 800 tons; so it means doubling up, and takes more power to get that tonnage into Thomaston from the west than from the east.

A train from Wisconsin east, through Thomaston, ordinarily would be made up and changed in composition there: that involves a lot of switching. The short cars are set out for the local, and if

there are through cars, the time freight gets them, even if they only haul them to Ewen, 32 miles, at the foot of another hard pull. They always cut down at Ewen, if they come in

with full loads; the tonnage into Ewen is 800, and out 550.

Nestoria is the end of a division, but all the Western Division engines come down to Michigamme, seven miles, to get to a town where the men can be cared for, and where there is an enginehouse. I do not know whether the mileage, Nestoria to Michigamme, so made, enters into our train mileage. If there is anything to go to Michigamme, they haul it.

At L'Anse, we keep one pusher locomotive. We do nothing with the other stalls in the enginehouse there; we don't use them for

storage, as there is nothing to store.

Marquette is a division point, where every freight train is broken up and rearranged. Nearly every train from the west has some

cars to take out for Marquette. Every train is subject to inspection, and some cars must be switched out for repairs; eastbound, we haul more tonnage, as a rule, except the way trains from the west; westbound, they cannot haul the tonnage out that they can bring in from the east; a train must be cut into five or six trains, to get it out of here, going west, and a lot of tonnage originates here.

The east-bound trains are arranged here, and Soo and St. Ignace loads put by themselves; it is seldom unless you are running iron ore in large quantities for Algoma Steel Co. at Soo, Ontario, that you can send trains out of here for Soo; the majority of the train would be St. Ignace tonnage, and at Soo Jct. they set out the Soo

tonnage.

A time freight into Marquette from the west would, under ordinary circumstances, have cars for Marquette, St. Ignace, Soo and intermediate points. If a car came into Marquette from the west on a time freight, and was destined for Newberry, it would

be set out and sent on, on the local; it would depend a good bit on what the car was. It might be sent on an iron ore extra, if such a train were running. If it arrived from Marquette from the West on a time freight, and was destined for Seney, it would get there in much the same way, unless it was a car of meat or perishable freight, when it would go on time freight, or the first train; if it were not perishable, it would go on the local.

That would be the same as to practically all shipments intermediate Marquette and Soo Jct. As a rule, the short-distance-haul cars go on the local, unless there are more than it can handle and not enough cars to fill out the time freight. The fact that you had a short distance of haul out of Marquette would not mean that the entire haul on that car had been a short distance. Soo Jct. is a division point, and the runs of locals 23 and 24 end there. The time freight from St. Ignace, with a shipment for points intermediate Soo Jct. and Marquette, would set out the car where it was going, unless it was destined to Munising, in which case they would set it out at Wetmore, to be sent into Munising Jct. by the local.

On a local, Marquette to Soo Jct., arriving on time, the conductor's pay for the trip would be \$5.43; the hours of run would be 11 hours and 55 minutes, and the distance 119 miles. On a time freight, Marquette to St. Ignace, 151 miles, arriving on time, the conductor's pay would be \$6.47; on these two trips, the time freight conductor is paid 4.15 cents per mile, and the local conductor 4.52

cents per mile.

On local 55, Nestoria to Thomaston, 50% of the time in station service represents my judgment of the amount, based upon observation; I have ridden on the train a great many times, and noted the time consumed on the train sheet. I have computed the time required to run the mileage, and subtracted that for the total time

allowed between terminals.

1048 In making up a time card, we make allowance for where the work is, from our best judgment; I have never seen one yet where too much time was allowed, but often there isn't time enough; that applies equally to time freights and locals. I have

made up time cards for time freights where the allowance for stational service was not enough, and I had to extend the time between terminals; that does not occur frequently. I don't change time frequently, but, when I do, I endeavor to arrive at the average running time, so as to get the train as near on time as possible. I make up the time sheets myself, and get at the amount of time allowed for a time freight to do switching by a general knowledge of where the work is. I think the work of a local is much more liable to vary, particularly in different seasons of the year; the work of locals is different in winter from what it is in summer, but the work of the time freight don't vary much.

From day to day, I don't think the work varies much on time freight, but there are exceptions, as trains get late from causes beyond our control. Sometimes, the trains have to kill time, but that will occur more frequently with the time than with the local freight.

I notice a difference in the time consumed in working in winter and in summer; we haven't made any change to take care of that condition, but notice it in the lateness of trains in winter. Frequently, trains are late in winter, but not so frequent in summer; this lateness is caused by weather conditions on time freight and intermediate work on local.

The principal winter commodities of the road are forest products, flour, feed and some grain; the flour moves from Superior and Duluth to St. Ignace and the Soo; forest products move everywhere, mostly to local saw mills, but large shipments of telegraph poles, posts and bark are shipped interstate off the road and to lower

1049 Michigan; the milled lumber goes wherever it can find a market, generally off the road, most of it east through the Soo, and a lot of it to Chicago; a lot of it comes east, across the state line, into Michigan. Some regular log trains—telegraph poles and

posts-move the year round.

I don't think that, from the records of one of these local trains, it is possible to reach a close approximation on the amount of stational service and running time. I based my testimony in part on reports, and mostly by observation. Every local freight, even though coming in on time, has done a large amount of station switching, and, where it is done within the time allotted to the train, there would be no report of it; the report is simply of delay, giving the reasons, and does not necessarily give the time consumed in doing station work. In making up time schedules, we allow about 50% of the time for switching work on the locals.

The coal, Marquette to the mines, is handled in the extra trains ore trains. We limit the down train in ore service to the average of up train of empties; the trouble, in coming down, is to hold them. In bringing an ore train down the hills, it is necessary to apply the air for all it is worth, and keep it on; that means considerable wear of track, car wheels and brakes; it is in excess of what it would be

running on level track.

In saying 5/6 of the freight business was interchange, I meant carload business, and included that received from and delivered to other roads; that is in tons, and 1/3 would be local. The auditor

and I took that off the books. My comparison, between the amount of stational service on interchange business with the service in originating or delivering a shipment, referred entirely to carload freight. In L. C. L. freight, in addition to the service I mentioned, the station

agent makes a way bill, listing every article shipped, takes a 1050 tissue copy, and sends it to the auditor, daily. Take, for example, a shipment of L. C. L. freight from Senzy, the billing and expensing, collecting the money, taking the item into his account, and reporting, would be performed by the agent; the freight

would be loaded and unloaded by the train crew.

If that were a charge account, it would be kept by the agent, and weekly settlement made. Of the shipping points in and around Marquette, the Dead River mill is the most remote from the freight station, being 3.5 miles; the next most remote is the branch prison, 2 miles; the next, Upper Peninsula Brewing Co., 1.75 miles; the next, Sinclair Stone Quarry, 1 mile; the next, the Gas Works, Sambrooks' Mill and stone quarry, each .5 miles. The service of taking cars to, and spotting them for, these industries, and bringing the cars into Marquette, is all done by switch engine.

At Ishpeming and Negaunee, eliminating ore service, we have one switching locomotive for each place. We have one, and sometimes two, switching locomotives in service at St. Ignace; frequently, train

28 assists, there.

Our passenger trains do not lay up at Houghton; they are through trains, and lay up at Calumet; these trains run through Houghton, the same as through any other passenger station.

On February 13, 1914.

LYTLE recalled.

Further direct examination.

By Mr. Eldredge:

I am in charge of D. S. S. & A. maintenance. I have endeavored in a general way to ascertain costs of maintenance of its industrial spurs and mine branches. In my judgment, the maintenance cost of industrial spurs will average \$300 per mile per year, and the mine branches \$375.

1051 LYTLE.

Recross-examination.

By Mr. Wykes:

The cost of \$300 a mile, estimated by me, to maintain log spurs and industrial branches, was average for the system; the maximum might be \$375, and the minimum \$200. I think it would be lower than the cost of maintaining sidetracks adjacent to main line; I do not know the average for all sidetracks. I base my opinion on the number of these industrial spurs that are not active, without many

tie renewals, while the sidetracks must be kept tied up, to support

the traffic.

I fixed the average for mining spurs at \$375; I think the maximum would not exceed \$500. The cost stated for maintenance of industrial branches would not include the maintenance of the main line switch; that has to be maintained for main line traffic. I don't know, and cannot estimate, the average cost of maintaining a main line switch. It would be a considerable item for all the switches on the line.

Complt.'s Ex. 74, Delf, apportioning stational costs. In testifying to the apportionment of stational costs, I did not take into account car balances, nor the question of interchange of foreign cars. I did not take into consideration the question of car accounting, the duties of the car accountant, the adjustment of balances through the auditor's office, the item of repairs to foreign cars on this line, the movement of empties back and forth, the work in adjusting and filing tariffs, the preparation of divisional sheets or the expense of outside agencies, advertising or traffic associations.

1052 LYTLE.

Redirect examination.

By Mr. Eldredge:

I do not remember having testified to Complt.'s Ex. 74, Delf, but, in saying that the service given to interchange was four to one, as against the service given at stations, I did not take into account those things, except that I did take account of the work of car interchange, but not the debits and credits in the car office on interchange cars.

Three Pacific type locomotives, numbers 550, 551 and 552. came on to road after the end of fiscal year 1913; they are in passenger service, between St. Ignace and Calumet. These locomotives are about six tons heavier than the 12 new type freight locomotives,

700 to 711 inclusive (1912).

I can see no difference in the relative weight of loading in intrastate and interstate freight cars. In my judgment, the greater proportion of short-haul local business is handled by way freight than by time freight.

LYTLE.

Recross-examination.

By Mr. Wykes:

I don't know as my duties go into the traffic department; I solicit, and get, a lot of freight. I have reports of a number of loaded cars to go, but no reports from which we could gain information of the average car loading; my statement with regard to average car loading is based on observation alone.

I think the greater number of cars in traffic are open cars. You gain your knowledge by observation, riding along, looking out of trains, to see how they are loaded—for closed cars. You cannot gain that knowledge, unless you actually look into them, and we only get that from a general inspection of the total train tonnage.

You cannot, by looking into a car, tell whether the freight

1053 in it is interstate or intrastate.

LYTLE.

Redirect examination.

By Mr. Eldredge:

The eight plus miles of south track, Eagle Mills to Winthrop Jct., is made safe for passenger use, and is occasionally used for detouring passenger trains, in the event of a blockade on the other lines.

LYTLE.

Recross-examination.

By Mr. Wykes:

It is customary for one railroad to use the line of another, in case of blockade, for purposes of detouring, and that is about the use this track has for passenger purposes.

1054

On February 11, 1914.

MORGAN W. JOPLING, a witness called by plaintiff.

Direct examination.

By Mr. Eldredge:

I live in Marquette, and have charge of a real estate and land company—the Peter White Land Co. I have been renting property in Marquette for the last four years, and feel that I can form an accurate estimate of rental values.

I know the upstairs portion of the D. S. S. & A. passenger station in Marquette. In my opinion, the offices on the second floor of

that station, would rent for \$100 a month.

JOPLING.

Cross-examination.

By Mr. Wykes:

For office purposes, the lower part of the station, assuming it to be divided into the same rooms as the upper part, would rent for approximately the same. I am one of the defendants in this case. Mr. Eldredge consulted me before he filed his bill, and I was made defendant on his initiative.

I recently purchased the land where the Colonial Building stands on Washington St.; that adjoins the Opera House on the east, and is the building Mr. Asire is in.

JOPLING.

Redirect examination.

By Mr. Eldredge:

I paid \$9,000 for this property—49.5 feet frontage on Washington St. by 150 feet deep.

1055

On July 21, 1914.

JOPLING, recalled.

Direct examination.

By Mr. Eldredge:

I was present during Mr. Werner's examination; I know the southwest corner of Front and Washington Sts. Our estate owns property further down Front St., and I own property on Washington St., and other property throughout the city, and think I know the value of business property in Marquette. In my judgment, the value per front foot on Front St., southwest Washington St. corner, exclusive of buildings, is \$350 per front foot.

JOPLING.

Recross-examination.

By Mr. Wykes:

That is the very best corner in town, and better than any of the other corners at that street intersection.

1056

On February 12, 1914.

EDWARD C. ANTHONY, a witness called by plaintiff.

Direct examination.

By Mr. Eldredge:

I live in Negaunee, having lived there since 1864. I am 74 years of age, and came to Marquette County in 1856. Marquette then had 600 to 800 inhabitants, and Negaunee 200 or 300; the settlement at Ishpeming was the Lake Superior Mine, and a few log houses along the Marquette and Bay de Noquet road. That railroad was there in 1856, and subsequently part of M. H. & O.

I was a brakeman on the Marquette & Bay de Noquet two summers, 1859 to 1861; the road then extended 20 miles, but we did not operate the two or three miles west of Ishpeming. The road extended 20 miles west of Marquette; we understood at the time that they had to build 20 miles to get the land grant, and we had no use for the upper end. The Marquette, Houghton & Ontonagon constructed the road west from near Stoneville, and I am pretty sure it reached Michigamme by 1864.

ANTHONY.

Cross-examination.

By Mr. Wykes:

The Marquette & Bay de Noquet line goes straight out from Marquette, west; the Marquette and Western, or south line, was built many years later. When the road was extended west from Michigamme, the country was practically unsettled from there to Houghton, except a little settlement at L'Anse, perhaps at Chassell, and the Mission at Baraga; there were no farms or anything of that character along through the country. When the railroad went west from Nestoria, in 1887, it went through a practically wild country.

Going east from Munising was a wild country, to the Soo, when the D. M. & N. went through, and down to St. Ignace, there were no farms along the line, but there was a settlement at St.

Ignace.

1058 On February 12, 1914.

EDWARD R. LEWIS, a witness called by plaintiff.

Direct examination.

By Mr. Eldredge:

I am, and have been, a civil engineer, for 24 years, being graduated from the Iowa State University. In 1906, I went to the Keweenaw Central as Assistant Chief Engineer, and spent a winter locating between Calumet and Keweenaw point, designing a few bridges and laying grades and track. In July, 1906, I went to Bay City, Mich., as Division Engineer, on maintenance, of Michigan Central, remaining there until I came to South Shore, July 1, 1912, as assistant to General Manager, doing engineering, principally.

I have given study to the apportionment of expenses of maintenance of way and structures between freight and passenger. In my judgment, the revenue train mile basis is proper for use in the apportionment of such expenses, so as to divide them with some degree

of accuracy.

Answering with the list of items in maintenance of way and structures before me, that basis can justly be applied to all those expenses except one or two items. The reasons why revenue train mile basis will equitably divide these items of expense is that: You must dis-

tribute the expense to the cause which makes that expense in that proportion to which the cause applies. In my judgment, the revenue train mile basis does that; in each of the items mentioned, all or a portion of the expenses are caused directly by either passenger or freight service. I don't see how you can divide superintendence in any other way. It is occasioned by the one service or the other, in proportion to the train mileage.

A portion of ballast deteriorates on account of the elements, as do ties. The chief element of the roadway and track expense, which is

largely a weather expense, is labor.

1059 Probably more of removal of sand, snow and ice is due to

passenger than to freight train service.

Of bridges, trestles and culverts, a little more is due to passenger trains than to freight; the element of weather there is extensive; conservatively, 75% is due to weather.

The expense of snow and sand fences and snow sheds is caused a

little more by passenger trains than by freight.

In buildings, fixtures and grounds, after the actual expense has been allocated to each service, there is still a little more due to the passenger service than the freight. The weight of the freight train is greater than that of the passenger train; that would not tend to a division on weight rather than on train mileage basis, as you have the speed versus the extra weight. The wear and tear on tracks—road-bed—is not due so much to weight as to impact. The weakest part of the track is the joint; the impact not only destroys the fastenings and joints, but breaks the rails. The excess in weight of the freight train causes slower freight train speed than passenger. It produces more wear on rail, especially on curves, because of the higher superelevation necessary for the safety of the passenger train at its higher speed.

This super-elevation not only retards the freight train, but restricts its tonnage; this restriction is an appreciable amount, and makes it necessary to reduce the grade on the curve .03 to .05 of a foot, per hundred feet of curve, per degree of curvature. The wear and tear effect of super-elevation on curves, extends to the whole track structure; it tends to displace the ballast inside of the curve, it rolls the rail out, cuts the spikes and ties, and affects the freight equipment

unfavorably, to an appreciable extent. It does not affect the passenger equipment, as the curve is elevated to suit the

passenger speed.

There is a higher grade of maintenance on South Shore on account of passenger service than would be necessary for the freight service, in that you elevate your track for passenger trains; you must have a better track for passenger trains, for safety, than for freight,

and that costs more money.

You have to get your track in shape for the long winter during the short summer, making the work more expensive, because it costs money to hurry. That is caused more by passenger than by freight, because you have to have it in better shape. During the winter, a lrage percentage of work is done on account of passenger service, to keep the road smooth, and more frequent patrol is necessary in cold weather, to guard against broken rail; it is easier and less expensive to maintain a railway where there is no frost than in this country. The most of that extra expense you must charge to the passenger

service; that is what increases the cost.

Bearing on removal of sand, snow and ice, and snow and sand fences and snow sheds, there is more necessity for protection of passenger trains against snow than for freight trains; therefore, a proportion of snow fences are in excess on account of passenger serv-

We haul a large proportion of our material going into track and roadbed in revenue freights; I don't think of any material used in exclusive passenger business so hauled. The ballast of the eastern division is largely hauled in revenue trains; that is of considerable importance as an item of expense.

The train mileage basis should be applied to all tracks, including terminals; you could differentiate and split hairs for a hundred years, and you wouldn't get any closer to it than you

would if you took all the tracks. If there be any error, I think that the train mileage basis, even taking all tracks, assigns less expense, if anything, to the passenger service than it should.

LEWIS.

Cross-examination.

By Mr. Wykes:

I have never previously testified to the propriety of the revenue train mile basis. My idea is that the division should be upon the factors which produced the wear or cost.

Q. Why, then, should you divide, upon the revenue train mile

basis, trackage over which no revenue train miles are made?

A. Because you have a great many other items on the other side of your accounts. On South Shore, the passenger service is not onehalf, and these tracks have been left in to offset that preponderence on the other side. I think there is hardly one of these exclusive freight tracks that a passenger train doesn't get on to once in a while, for purposes of passing, etc.; they get on to those tracks on every railroad. Because once in a year, or in two years, or random instances of that kind, a passenger train may on some occasion get on to one of these tracks is not the only cause for dividing their maintenance expense on revenue train mile basis; I said that was part of the cause.

I do not wish, in any sense, to go back upon the rule, first stated, that the cost should follow the thing which produces it. reason for putting all tracks in is because there are other items on the other side of the account; e. g., excessive wear on track by freight trains, removal of sand, snow and ice, snow and sand fences and snow sheds, and roadway and track; I think that is all.

Q. Now, why is expense of roadway and track an offsetting 1062 element upon this particular item of sidetracks and branches; just give us that, please?

A. Because there is more expense of that item due to freight train than passenger.

Mr. Eldredge: Did you answer that exactly as you intended?

A. Due to passenger than freight.

Q. In what way due to passenger; why?

A. Because of higher speed of the passenger trains, and the greater

effect that they have on the track.

I wouldn't care to express that in a percentage off-hand; I should think it could be done. To do so, you would have to keep the account of the cost; I don't know that I would explain it further. I say you would have to find out how much it cost. You would have to go into each various item of expense of running each train and wear on the cars and track, going into the account in detail. I have not done that on this road, nor on any road, exhaustively. You could find out how long your ties and material lasted, and divide by the number of trains, on a train mileage basis. I intended to say that you would have to keep the accounts—the actual figures. revenue train mileage basis would be an approximation. I have not been able to fix the limits of error or percentages within which that approximation would be certain or uncertain. I have not done that, and don't know anybody that has. This is the best basis I have thought of; no others were satisfactory.

I have thought of, and discarded, the ton mile basis; you might take the locomotive mile basis; I don't think any of them nearly so good as the train mile basis; it is merely my judgment. never gone into it with that certainty that would permit me to say

how close that would come to actual analysis of the accounts if kept with the idea of making separation, except in a com-

parative way. It is my judgment that the accounts could be so kept that you could get pretty close to a correct separation between passenger and freight, by making the charges as the work is done.

I wish to change what I said as to keeping accounts to reach a close approximation; on reflection, I do not believe you can do it.

It must be, to an appreciable extent, arbitrary.

Q. That being true, in your judgment, now, there is no real test of the correctness of the judgment of the man who furnishes the basis for doing that, other than the judgment of some other man to confirm it. I mean, it is a matter that rests, and must rest, solely in judgment, this division between passenger and freight, and the proper basis therefor; it cannot rest in accounts, according to what you now say?

-. Not altogether; it can rest in accounts, as I told you, to some

extent.

Q. You have never prepared any figures to indicate the justification of the revenue train mileage basis, have you?

Q. And you do not know of any one else who has reduced that to figures?

A. No.

Q. The justification for it, then, rests in judgment, rather than in figures, does it not?

A. A certain percentage of it rests in judgment, certainly.

Q. What part of it does not rest in judgment. Or, what tests, in the way of figures, can we apply to determine whether the witness who says that it is proper is correct, or the witness who says that it is not — correct?

A. I would say every railroad is keeping accounts, and the judgment that you give must be based on those figures. You could not

say that you could divide on a train mile basis.

Q. Now, what investigation have you made of the accounts of the South Shore, to test the correctness of your judgment on this particular question.

A. I have not made any. Q. You have not made any?

A. None, except the figures I have seen and the accounts that they

keep.

Q. Now, you say, first, that the speed of passenger trains produces a wear upon track in excess of the wear of a freight train going the same distance. Have you, or can you refer to, any figures which would indicate that to be a fact.

A. Why, yes.

Q. Give me the figures then?

The Master: I do not see what figures he could give.

Mr. Wykes: Well, he says there are figures.

A. Your labor and material costs you more if you have to keep your track up for passenger trains than they do for freight trains. Now, the figures are that it costs you more money.

Q. Is there any source that you can go to to pick out the parts of any figures that relate to the passenger cost or to the freight cost?

A. No, I do not know as there is.

Q. When you say that figures would represent that, you mean it is an expression of amounts based upon the judgment of the expert to the effect that the one costs more than the other; that is what you mean, is it not?

A. Yes.

Q. And you cannot refer to any figures that will indicate a certain cost for the freight train mile and a certain other cost for the passenger train mile, in the wear of track, or roadway and track?

A. No.
Q. And I think you stated yesterday you had not been able to express that in a percentage, even?

A. No.

Q. And you did not know of any one who has?

A. Not precisely of any one who has done it exactly.

Q. Do you know of any one who has attempted to, as fixing ranges of percentage?

A. We are all trying to arrive at a basis on this matter. It is, to

a certain extent, arbitrary; I admit that.

Q. Do you know of any one who has fixed a range of percentages

that would be the high and low mark of the excess wear by a freight train mile from a passenger train mile?

A. No. sir.

The Master: Is there any possible way of figuring the percentage? A. I would not like to say that it was not possible, absolutely, but it is not possible to date, I believe.

Q. Then, so far, it rests solely in judgment?

A. Yes.

Q. Unless we have new light, it will continue to do so?

A. Yes, I believe so.

Q. Now, the element of greater cost attributable to passen-1066 ger service due to elevation of curves, are there any figures that you have been able to determine that will indicate that extra

A. I would have to answer that in the same way, to a certain ex-

Q. Give us the figures, then, or percentages, either way?

A. I could cite instances where a reduction of super-elevation in a curve permitted the hauling of more freight by the same engine over that particular portion of track. Those matters are of record.

Q. But that goes outside of the range of the thing upon which you testify, because that does not go to the question of expense of

maintenance of way and structures?

A. Possibly I misunderstood the question. You did not say You did whether it was maintenance cost, or whether it was not.

not stipulate expense of maintenance.

Q. No, I did not stipulate expense of maintenance. But, as a matter of fact, your testimony referred to the division of maintenance cost on the revenue train mileage basis, and the revenue train mile does not comprehend any division of the limitations upon the amount of traffic that a particular structure would produce. Simply, you use the revenue train mileage basis for the division of expenses, and it was to that I intended the question directed. If you will answer it in that light, it will satisfy me.

A. I think I have completed my answer.

The curves on a railway for freight traffic are elevated for a speed of 15 miles per hour; where we have freight and passenger trains on a single line, as a matter of safety, the curves have to be ele-

vated much higher for passenger, which makes it more diffi-cult for freight trains to get over the road.

The limitations imposed upon the freight track in the ratio of reductions of tons depends upon the degree of curvature. Five degree curves are considered sharp curves in this country, on main track. The percentage of difference in the amount you are able to haul, as between a curve elevated for 15 miles and one elevated for 40 miles an hour, with a radius of five degrees, is about 6%. The real limitations on South Shore traffic are the grades; curves produce the effect of grades.

I could not tell you the limitation produced by a 1% grade over a straight (level) track, there being no curve; nor can I tell you the limitations of a 2% or 25% grade; it could be figured out. The

grades furnish the real limitations of loads on the South Shore. With curves eliminated, the grades would still cause limitations; the curves cause limitations over what now exists over grades on straight track. The grades on straight track now produce or cause limitations.

tions on the quantity of freight that can be hauled.

If you had a curve on a level track, you would not have the limiting conditions. I have known 40 miles an hour to be made around a 10 degree curve by a passenger train, but that is an extreme case. The safety would depend on the elevation. I do not know how many curves there are on the South Shore. I have made no classification to determine the number of curves of different degrees on the entire line; I could tell you on certain portions. On certain of the grades it is necessary to put on an extra locomotive, to get the freight trains over; e. g., at L'Anse and Ewen.

1068 While I have not calculated the average difference in power to the freight engine consequent upon the excess of super-elevation of curves, I should say that, on an average, that excess of super-elevation makes a difference in every ton hauled over the road of 2.5%, meaning you can haul that much less freight in weight.

That percentage involves the mechanics of curve resistance.

One of the factors of the centrifugal force is weight; it would be less for 50 than for 100 tons. I could not tell you the average freight train or passenger train tonnage on South Shore; it is very much less for passenger. I have not estimated, and do not know, the percentage of South Shore trains carrying capacity loads. They are supposed to be loaded to their capacity; if we do not have the traffic, we would not send out the train. Through trains are loaded full, as nearly as possible. Way freights sometimes have to be sent out. The scheduled trains run according to schedule.

I think the grade, rather than the curve, or, rather, the grade in combination with the curve, is the limiting factor on all divisions.

You could haul more up L'Anse hill if you did not have the curves, especially those at the top. Assuming a curve elevated for 20 miles an hour, and a freight coming on to it at 35 miles an hour, it would slow down very suddenly, and cause the cars to incline to the inside of the curve very sharply, thereby raising the center of gravity, and tending to derail top-heavy cars. It might leave the track. If it did leave the track in such manner, it would be a considerable item of expense; it would be inadvisable, and verging on the unsafe, to operate at that speed.

In going down these hills, they keep the train under full control, whether passenger or freight, and the down speed is slower than on straight level track, for both; going up a grade like

1069 L'Anse hill, the speed is greatly diminished, in either character of trains. Calculated on the basis of loss of power, the curve reduces locomotive capacity 2.5%; that is the one thing I have been able to reduce to a percentage out of the greater cost. The others I haven't been able to express any percentage for, and don't know exactly what weight they would have.

Q. Did you figure, in percentage, the weight that should be given

to the freight side of this, due to the greater tractive power required of the freight locomotive? I am not speaking about curves, but I am speaking about the revenue train mileage basis, generally.

A. Well, only such as my knowledge and judgment dictated.

Q. Were you able to determine a percentage for that?

A. No, I think it would be very difficult.

Q. Were you able to determine a percentage due to the greater number of car wheels and wheel impacts in the freight service than in the passenger service?

A. No, I haven't reduced that to a percentage.

Q. Were you able to determine a percentage due to the greater load in the freight service than in the passenger service?

A. I did not do it.

The Master: Would you have to have the composition of each train, in order to do that?

A. Yes sir.

I took into account the extra time that would be consumed by the freight train in getting over the track, to the extent of knowing that the condition exists. I haven't reduced it to a percentage. Freight

trains are delayed, largely, by keeping out of the way of pas-1070 senger trains, which tends to make them slower. The percentage which should be added to the passenger side, for the

latter element, I could only estimate; that rests in judgment.

I cannot tell you the consideration I gave to the fact that the freight train is longer in making its mileage than the passenger train in the part of the expense of maintenance of way and structures due to weather conditions; I thought of it, and considered it, and did not make any percentage because I didn't make any figures on the subject. The only other thing I can think of to produce extra cost on the freight side is the small matter of freight siding yard tracks.

The ice expense comes in at water stations, grade crossing, and where switching work is done. After a sleety storm, there is a good deal of work to clear the track of snow and ice, especially on the main track, where the switch engines do a very great deal of their running; it is much less elsewhere than on the main track in yards.

Removal of sand, snow and ice requires considerable work around switches; most of the hand work is done at switches and water stations—main track switches; sometimes the sidetracks kept open are cleared with snow plows, and sometimes not. The shovel work under this item cannot be separated from the snow plow work, nor the switches and sidetracks from main line. The freight traffic, other than iron ore, on South Shore, is heavier in winter than in summer; that requires keeping clear, during the winter, of tracks used in freight service. A large percentage of the freight tracks are used in winter; the traffic spurs are kept clear if they are used in winter; logging spurs, etc., are usually used in winter, when there is any operation at all.

I cannot give you the comparative life of a switch and a piece of straight track on South Shore; certain parts of the switch have 071 less life than straight track, with the same amount of traffic—

the frogs and switch points, for example; the frogs must be

taken out, repaired and put back; frequently, switch points can be

repaired in the track.

It is my judgment that there is a considerable expense in maintenance of way and structure due to starting and stopping of trains: that being done with an air brake puts a much greater strain on the structure on which the engine and train stands; e. g., stopping a train on a bridge, or reducing the speed, with an air brake puts a terrific strain on the structure, causing impact. The starting of a long freight train causes an additional strain; the longer the train, the more slack there is, and the more impact in taking up that slack. The locomotive, itself, in starting without a load, or with one or two cars, is an item of considerable stress on the tracks; that would tend to displace ballast, and wear ties and rail; I shouldn't say the starting of a train would be a very great stress on ordinary track; continual starting and stopping at a particular place would cause a hardly appreciable effect; it has that tendency, but it would be small except in case of a bridge.

I have never investigated coal costs of starting and stopping trains; it would take more coal to get a train under way than to keep it moving, after it was under way. That 75% of the bridge maintenance cost is due to weather is conservative; the rest of the cost would be the wear on a bridge due to the movement of trains over it—the effect of the rolling load. An appreciable part of roadway and track cost is due to weather; a large part of the winter work is due

to frost.

Q. When you get through with the revenue train mileage basis as a basis for apportionment of common expenses between passenger and freight, I think you have said it was an approximation, and it rests entirely in your judgment, I take it, without building it up on

figures or percentages?

1072 A. It is not built up on percentages.

Q. It rests in your judgment of that being a proper basis?

A. I don't like to leave figures out altogether in this thing, because figures are the basis of it, after all.

Q. Your judgment acts on the figures?

A. Yes.

Q. And you haven't produced any figures, with the exception of those you gave for the curves?

A. That is all.

Q. And you haven't any to produce?

A. No.

Q. In what manner can that judgment be tested?

A. To a large extent, precedent. There is experience, in all of these things, from which we form our basis of opinion.

Q. But it can only be tested by opinion; it cannot be tested, to say that you are right, by percentages or figures; it must be tested by opinion and by judgment?

A. Yes.

Q. In what way can we determine whether you are right or whether the witness who says the revenue train mileage basis is not a proper method of division is correct?

A. Only by judgment.

LEWIS.

Redirect examination.

By Mr. Eldredge:

I heard Mr. Young's testimony, yesterday, regarding impact of trains in striking bridges. I know, and it is a well known 1073 fact, that impact is a larger consideration in the deterioration of a bridge than weight. When a load rolls, there must be impact. I do, and I do not, agree with Mr. Young as to the effect of the first impact. He said the greatest impact on the bridge was the first blow; that is the case, but it is due to the effect of striking the end of the structure, more than to the fact that there is greater impact; you are striking the end of the structure, from solid track, instead of striking it in the middle. You are coming off of a comparatively immovable structure on to one in which there is some give; if you didn't have that element, the impact would be the same. The effect of the impact in striking the end of the bridge is the greater.

LEWIS.

Recross-examination.

By Mr. Wykes:

I have not determined the amount of impact that would result from a train weighing, say, 40 tons, going at a speed of, say, 30 miles an hour, as against one weighing 80 tons, going 20 miles an hour; I am simply stating theory; I think I have determined that a good many times. I know what effect the increased load produces on the impact, but this element enters in. We restrict the weight to the safe load, allowing for impact; the amount of load must be taken into account in the amount of impact. You would take the weight of the engine; the train is not on the bridge.

1074

On February 18, 1914.

ROBERT B. RIFENBERICK, a witness called by plaintiff.

Direct examination.

By Mr. Eldredge:

I am, and have been since 1896, a civil engineer; I am now Con-

sulting Engineer of the Detroit United Railway.

I was employed on D. S. S. & A. during construction, Nestoria to Iron River, Wisconsin, in 1887. When I went there, the cuts and fills were completed, the rails were down, and some, but not the full quota of, ties were. The land was heavily timbered—virgin forest at that time.

I remember no town from Nestoria west, except Dogwood, now

Saxon. The railroad crossed the military road at Bruce's Crossing. My work was putting in alignment and grade stakes for ballast; we had to widen out practically all the embankments to standard widths, and clean out the cuts, before we could ballast. This was by reason of the sinking and sloughing off of the roadbed. We sometimes raised embankments two or three, and in some instances four, feet; we had several sink holes where we put carload after carload of material; they would stay up for a while, and then we would go back and

put on more.

That, originally, was considerable; I have no accurate memoranda or data of the number of yards; I think it would run into hundreds of thousands of yards. The grading had been done by contract, and was completed and accepted as being up to grade and specifications; at least, no question on that subject arose after I was on the ground. I remember no embankment that did not require some widening and dressing up; the larger embankments require the most. I think I was engaged on that work all that summer, and we had construction trains continuously.

1075 RIFENBERICK.

Cross-examination.

By Mr. Wykes:

When I went on to the road, it was completed, as far as the original grading was concerned, and the contract work was done; it was completed to subgrade, and the ballasting would necessarily come after ties and rails were laid.

The going wage for common labor in 1887 was exceptionally high

up there; we had to pay \$2 a day for poor labor.

1076

On March 24, 1914.

SUMNER G. HORTON, a witness called by defendants.

Direct examination.

By Mr. Wykes:

I live at Flint, Mich., and am 49 years old. I am employed by State Tax Commission, as foreman; have been with them 12 years, except three years. The last four years, I have acted as examiner and special assessor, giving my whole time to valuation of property. I have present charge of valuation work in Grand Rapids; the purpose is to place that city on a cash value basis. Previously, I had charge of valuation in Van Buren County, and previous to that in Marquette County with Mr. Twiss. We spent about eight months in the latter county with a force of five to seven men; Twiss was there during the time we were at Marquette city, possibly two months. We went there Feb. 22, 1913, and had made some preparatory work be-

fore that. The values we reached there were used for purposes of

assessment in 1913.

On Complt.'s Ex. 1b, Riggs, description 2, figure 2, in Marquette County, right of way, from Chocolay depot, mile post 150.56, to mile post 151.92, 1.46 miles. At East Lakewood, the lots are 100 feet wide, and vary from 440 feet to 1,100 feet in length; about 12 are above 800 feet, eight are above 600 feet, and the seven remaining lots run from 440 to 476 feet in length. In Riverside Add., Lakewood, all lots are 100 feet wide, and vary from 400 to 700 feet in length; about 12 lots are above 500 feet long, about 10 lots 400 to 500 feet long, out of a total of 51 lots; plat lies parallel to south line of South Shore, south and west of railroad, on each side of Chocolay River, and lots in most cases run to river.

In East Lakewood, lots 2 and 3 sold for \$175, lot 7 sold for \$95, and lot 8 for \$100. In Riverside Add., lot 21 sold for \$75, lot 22 for \$120, and lot 24 for \$100; these considerations are verified by myself, either through owner or Mr. Asire, who

sold them. The north end of these lots runs to railroad; houses are

built facing both ways,

In the plat of Lakewood, lot 1 sold twice for \$100, lot 2 for \$120, lot 3 for \$120, lot 4 for \$100, lot 5 for \$100, lot 12 for \$125, and lots 16, 19, 21, and 26 for \$100 each. On description 3, mile post 151.92, at the city limits, to mile post 153.5, where the main line enters Lake St., I valued the land at \$100 per acre; we placed it there for purposes of assessment. On description 6, Marquette County, 170 feet on west side of Lake St., immediately south of Hampton St., I valued the lots at \$200 per lot. I based that value on value placed on adjoining lots, by our examiners. We made very little change in the values placed by the committee in Marquette on these lots.

Description 7, 47 lots between Hampton and Mesnard Sts., I valued at \$200 per lot; on description 8, \$100 per lot. We had no sales of vacant lots; we estimated what buildings were worth, and deducted that value from the total value; we had sales of lots with buildings.

In description 9, right of way from east line of Adams St. to city limits, on south line, mile post 272.75, 26.60 acres, I valued land at \$100 per acre, to Catholic cemetery, and \$25 from Catholic cemetery to city limits. On description 10, right of way to Marquette quarry, I valued at \$80 per lot; lots are 50 by 134 feet; we paced them off to get the size, and had reference to sizes of adjacent lots.

I do not recollect any sales of lots in this neighborhood; we had some sales of lots with buildings on, and by deducting the value of

the building we could tell what the lots were worth.

1078 In description 11, lots fronting on west side of Lake St., between Jackson and Mesnard Sts., I valued the eight lots at

\$400 per lot; lots are 66 feet front and 134 feet deep.

In description 12, 12½ lots, 66 feet wide, between Jackson and Mesnard Sts., I valued lots 41, 42, 43 and 44 at \$250 each; lot 1 and east half of lots 31 and 32 at \$250 each; lots 69, 70, 71, 72, 73 and 74 at \$200 each.

In description 13, land fronting on west side of Lake St. from Jackson St. to north line of Ely lot, 1,000 feet, I placed a value on the

first eight lots, 66 feet each, starting from south, at \$500 each; the second 8 lots at \$600 each, and 4 lots at \$250 each; total, \$9,800 for parcel. Those would be in rear of Champion St. lots.

In description 15, 184 feet frontage on Front St., south of Baraga,

I valued land at \$90 per front foot on Front St.

Description 16, tract of land fronting on west side of Lake St., extending from north line of Ely lot to Baraga Ave., 1,110 feet, I

valued at \$15.00 per front foot, measured on the street.

In.des ription 17, right of way fronting on Baraga Ave., parts of lots 3, 4 and 5, block 3, C. M. & I. Co. Add., and a small triangle adjoining lot 3, I valued land at \$30 per front foot; I had no sales in direct vicinity.

In description 18, right of way fronting on Spring St., also triangle on corner of Third and Spring Sts., I valued land at \$20 per front

foot on Spring St., including triangle.

On description 24, 69.7 feet frontage on Front St., being ap-1079 proach to ore dock 4 on both sides of street, and approach to dock 5 on east side of street, I valued land at \$150 per foot on east and west side of Front St., north of Main, and \$125 per foot on

easteast side of Front St., south of Main.

On description 26, frontage on east side of Front St., 30 feet, \$125 per foot on Front St.; in description- 27 and 28, the site of the passenger station, I valued the portion facing Front St., 183½ feet (153½ feet up to right of way of the Jackson cut) at \$150 per foot, and for the remainder of the description, back of the Front St. lots, I took the same number of feet facing Third St., at \$40 per foot. Lots are 124 feet deep on both streets; that leaves a parcel 326 feet by 183½ feet deep at \$45 per front foot on Main; total, \$49,760 (for the two parcels, just the land).

On description 29, which is 14,608 square feet back of the buildings fronting on Washington St., I valued the lot facing Third St., 38 feet side by 127 deep, at \$50 per front foot. For the balance, 12,386 square feet, or 220 feet in rear of lots on Washington and Main, I added 15% for Washington St. frontage, or \$4,950. I added this to Washington St. frontage, because this would give the property on Washington St. and entrance to the rear, or place to extend their buildings; it would be worth more for that than for any other pur-

pose.

On same exhibit, description 30, and between Third and Fourth Sts., I valued 270 feet on Third St. at \$40 per foot, and 120 feet on Fourth St., at \$30 per foot, and 250 feet on Maple St. at \$20 per foot,

making a total of \$19,400.

In description 31, lands lying between Fourth and Fifth streets, I valued land on both streets, 120 feet deep, at \$20 per front foot, with a depth of half way across the block.

1080 On description 33, I placed a valuation of \$19,000, on 54.69 acres, and included in this \$7,000 on 35 lots on Washington

St.: the balance I figured as acreage, at \$12,000.

On Complt.'s Ex. 6a, Riggs, in this description, a parcel of 4.09 acres, divided into a tier of lots on Washington St. and acreage in the rear, I valued the lots at from \$300 each, starting from Park St., to

\$250, up to Seymour Ave., and the area back of that to the south at \$180 per acre; this value would extend through the green parcel, 7.15

acres to the south, and west to Seymour St.

Nester Add. is in this neighborhood, north of Washington St., Block 1 has 16 houses on 26 lots, block 2 has 10 houses on 29 lots, block 3 has one house on 26 lots, block 4 has one club house on one large and 17 small lots, block 5 has no houses, block has one house on 26 lots, block 7 has 7 houses on 31 lots, block 8 has 7 houses on 23 lots, block 9 has one house on 26 lots, and blocks 10, 11 and 12 have no buildings.

West End Add. lies directly west and north of Nester's Add.; it has no houses—about 157 lots. Homestead Add. lies south of descrip-

tion 33: it has 6 houses and a greenhouse, on 103 lots.

In description 34, right of way from tract 33 to fly switch at end of Dead River railroad, I valued at \$100 per acre, same value we placed on adjacent lands. I was present at sessions of Board which placed these values; Harlow Clark, in the immediate neighborhood protested against the assessment.

In description 35, right of way from description 34 to west city limits, 2.29 acres, I valued at \$100 per acre, same as adjoining prop-

erty.

1081 In description 36, right of way, Dead River railroad to to North Marquette through the West End plat, approximately 160 rods, I valued at \$100 per acre; following on from the West End plat, through section 15, at \$30 per acre; section 10 at \$50 per acre; lots 3 and 5 in section 11 at \$100 per acre; sections 2 and 11 at \$160 per acre; beyond the West End plat, land adjacent to railroad is cleared, but not improved—stumps and brush most of the way.

In description 38, from Marquette city limits, on south line, to Eagle Mills junction, I think value placed was \$5 per acre on vacant

lots adjoining city, but did not value it myself.

In Marquette, I made personal investigation as to conditions, and verified sales values as taken from records; had a considerable number of sales there. In verifying sales, I learned, either from buyer or seller, or someone that knew, the actual consideration and conditions of sale; we made inquiries of many people. After the investigation, I felt competent to place these values. The values in each instance are my judgment, based on value of adjacent lands without improvements in shape of buildings and structures.

Mr. Harlow Clark protested to the Board against a value of \$100 on lands west of 72 acre tract; he claimed it ought not to exceed \$75. Mr. O'Meara protested against values placed in vicinity of description 15. The values against which he protested were the same as placed on the 184 feet in description 15; his property is directly across

the street, on the ocrner.

In description 30, Mr. Clark appeared for the same reason he did before. His property lies across Maple St. directly adjoining on the south; values on his lands were fixed on the same basis as values fixed on this description; he claimed they were too high.

I had a sale on south side of Washington St. between Front and Third Sts., lot 2 of block 15, at \$4,200; it was bought

from an estate, for purposes of building Elks Temple; it had 381/2 feet frontage, and a building which was sold for \$150 and removed.

HORTON.

Cross-examination.

By Mr. Eldredge:

I went to Marquette Feb. 22, an stayed until October; I worked on city of Marquette to June 1st; started outside in March and April and when weather got so we could. We had six assistants part of the time—two during May. I finished Marquette some time in June; had two assistants after June 1st. Mr. Twiss was there abount five weeks in April and May—maybe first week in June.

I personally reviewed the property that the examiners had examined, and examined and placed value on a portion of the city, myself; in reviewing property, I took the examiners' notes and valuations, and made comparisons; I went out and saw the property, and made inquiries about it. Mr. Hubbard, Mr. Keith and Mr. Davis

were examiners; none of them lived in Marquette.

On east 50 feet of lot 5 of block 11, lying next east of opera house on Washington St., I found, at time of inspection, a vacant lot assessed at \$4,000 for 1912; the committee placed a valuation of \$6,500 on it; I valued at \$8,000 for 1913, after the sale, thinking the party paid too much. He was forced to pay more than it was really worth, it being the only vacant lot left.

We tried to place the true cash value in every instance—the usual selling price under ordinary circumstances. When there had been no sales in the neighborhood, we would try to find out what anyone would pay for it, and what the owner would ask for it; that would

assist in helping us to place a value on it.

On Washington St., each way from the corner, we made very little difference in the value of the land over that on Front St. I valued property on Washington, corner of Front, at \$200 per front foot, \$175 for next lot, and \$150 for the remainder in the first block; I put same value on west and east sides of street,

as far as Main.

In description 24, I placed value on 697 feet frontage on Front St., between Washington and Main, at \$150 per foot; it lies right next to Marquette County Savings Bank, which stands on one of the best corners in the city, which we valued at \$200 per front foot. I found no sales there; I valued lots on the corner of Front and Washington at \$200 per front foot, and property on side of Front St., opposite Savings Bank, at \$150 per front foot; in other words, going west on Washington Street, I put a valuation of \$175 per front foot next to the corner, and, on Front St. \$150 next to the corner.

On that basis, the Jopling purchase would have been \$7,500; I put \$8,000 on it, because I thought that was about what it was worth. I valued the opera house and all the way to Third St. at \$150 per front foot. The land sold to Elks Temple was left at \$4,500; I paid

more particular attention to frontage; Elks lot frontage was 38½ feet; I estimated the depth, but knew it was a shallow lot. I valued west side of Front St., opposite the 69.7 feet of parcel 24, at \$150 per foot, and put the same value on both sides of street. Property on Front St. is of no greater value than property on Washington St. I wouldn't make any great difference.

On item 29, after valuing lot on Third St. 39 by 127 feet, that left 12,386 square feet; in valuing this at 15% of Washington St. frontage, I only went to within 127 feet of Front St. The valuation to Front St. had already been placed in description 24. I placed this

15% valuation, because it would add 15% to value of Washington street frontage by having that extension. The 15% is my judgment of value.

We used the committee's valuations where we felt justified in doing so; we were governed by them, to some extent. I valued railroad property according to my idea of value of nearby or adjoining property.

In description 33, I valued the 35 lots on Washington St. at \$200 a lot, \$7,000; about 15 lots would be on the 4.09 acres. I valued the remainder of the 54 acres, together, at about \$180 per acre; depth of Washington St. lots is 124 or 132 feet.

I valued lots in Harlow's Add. No. 3 at from \$300 to \$400 each; they were all 50 foot front, and varied in depth from 80 feet, next to Fifth St., to 125 feet on Park St. end. I had reference to values from Seventh to Park Sts. in fixing these. Lot 40 in this addition is worth \$300. I valued 15 lots at \$300; they would average 50 by 132 feet—six lots, or \$1,800, to the acre. I valued land immediately south of those lots at \$180 an acre; they are not available at present. I arrived at the \$1,800 an acre value for lots on Washington St. by simply placing a lot value on an improved street. I arrived at the \$180 an acre value by what I thought it would sell for; that was on the basis of 70 acres. This 70 acres covers the south half of northeast of section 2 lying south of center of Washington St., produced, except part used for railroad purposes, and except 528 feet wide, described in Liber K. of Deeds, also part of southeast of northeast of section 22, lying between right of way of D. S. S. & A. and that of former B. De N. & M. railroad.

I valued lots on north side of Washington St., from east line of

I valued lots on north side of Washington St., from east line of Seymour Ave., west to Lincoln Ave., at \$250 to \$350 a lot; they are 50 by 142 feet.

1085 I valued lot 14 of Nester's Add., without improvement, a corner lot, at \$350; lot 1, in same block, a large lot in the corner, next to park, at \$500—no house. I valued lot 1 in block 3 at \$200, and lots 11, 12 and 13, together, at \$525.

I valued lots 7, 8 and 9 of Homestead Add. at \$70, together: they are 50 by 144 feet; lots 10 and 11, together, at \$100; lots 20, 21 and 22 and 23, together with a small barn worth \$50, at \$400; lot 24, assessed with three others, including a greenhouse and residence, at \$100 each; lots 36 and 37, cut by the railroad, together, at \$50; lots 44 to 67 at \$20 each; they are 50 by 112 feet; lots 68 to 73 inclusive at \$20 each.

I valued the lots of block 4 in the tract 300 feet square in Nester's

Add., 6 lots facing Washington Street, at \$100 each; those on Bluff St. at \$20 each. I valued west 40 feet of lot 5 of block 1 of this addition at \$1,700, including the building; I passed my judgment on that personally. The other 10 feet of this lot, included with lot 4, I valued with the building, at \$1,200.

I would value the tract of 4.09 acres at \$7,500; I figure the acreage adjacent to the lots at \$200 an acre. There are 15 lots, at \$300 a lot: I only figured 13, and I figured the remaining two acres at \$200

an acre—\$4,500 plus \$400, a total of \$4,900.

I valued the 3.56 acre tract, immediately south, and the 7.15 acres south of that, at \$180 an acre. I would value description 32, 5.16 acres, at 200 per lot, for 90 lots.

In my valuations above, and of railroad property generally, I took conditions as they were; the use to which the property might be put was not considered, to any extent. I arrived at my values

by applying the value of nearby and adjoining property. 1086 valued the two acres south of the lots on Washington St. at \$200 an acre, simply as acreage property. I assumed a valuation for 70 acre tract, and then applied that acreage value to everything except what lay on Washington St., considering the location.

As to a bona fide offer of \$2,700 for lot 5 in block 1 of Nester's Add., I valued it at \$1,700, cash value; I have known of such changes

in six months or a year.

In block 3 of Harlow's Add. No. 21, on Washington St., I valued lot 1, without improvements, at \$100 per front foot; it is 50 feet front and 90 feet deep, across from the post office; I would run the rest of the block at \$75 per foot. In the next block west, I would put lot 1 at \$75 per foot and the balance at \$50, to Fifth St. On Harlow's Add. No. 2, there were some old buildings of practically no value; I valued that at \$15,000.

I valued description 27 at \$150 per foot on Front St., and at \$40 per foot on Third St., running back 124 feet; \$45 per foot for 326 feet facing Main St. I considered how that property could be utilized to best advantage by filling cut in Main St. and facing some of lots

on that street; I included the cut in my valuation.

I judged that property on Washington St., from Front to Third Sts., was of equal value with that on Front St., south of Washing I found out what rents were paid on the two streets; I inquired of owners or occupants, every one of them; I took every business block in Marquette. If we were not able to find the owner, we got it from the occupant, or some one that knew.

In valuing description 6, I compared it with lots 10, 11 and 12, adjoining it, farther west, across the street. I considered property on Burt & Ely Add.; I considered, generally, prop-1087

erty in vicinity.

Property adjoining on north and east is railroad porperty; Gas Company is in that. Mr. Twiss valued the gas plant at \$25,000; he valued the corporations.

I compared tract No. 8, being 12 lots between Division and Adams Sts., in John and William Burt's Add., with lots in same addition. In valuing description 11, I considered lots in that vicinity and Penney and Vaughn's Add., and the same for description 12.

In description 18, I valued the 150 feet frontage on Spring St.,

including the irregular parcel across the street, at \$20 per foot.

The south half of the southeast of section 10, Dead River branch, is better land than that southwesterly of it; it will bring more money, being at to platted portion on north end of city, the fair ground and proved farms surrounding it in the north half of the northeast section 15. The greater value of this Dead River branch in section 10 over the land lying southwesterly of it is caused by the difference in land value between sections 15 and 10, condition of land, improvements, etc.

The south half of southeast of section 10, owned by Mr. Neidhart, I assessed and valued at \$50 per acre. I began \$100 valuation in lot 3, adjoining plat of north Marquette; I assessed the land at \$100 per acre. I began \$160 valuation in sections 2 and 11, north line; it was assessed locally at \$160 per acre. I did not assess lot 5 of

section 2; that is a part of Presque Isle Park.

1088 HORTON.

Redirect examination.

By Mr. Wykes:

The map I used was made in 1894. The plat in section 14, was made since then; I don't know when; it now includes Marquette

Land Co. plat No. 1.

In valuing the Jopling purchase at \$8,000, I considered the claim that he paid more than it was worth, because it was the only available lot, and he had to have it. I did not consider myself governed by the committee valuation, but was influenced by it somewhat. Our work in Marquette was part of a general campaign to bring assessed values in the state to cash value.

On Washington St., I put the lots in Nester's Add., a little higher than on south side of the street; that is the best side of the street;

a higher and better location, and a better class of buildings.

In valuing description 32, I considered the necessity of extending Spring St. through the tract, to make those lots available; I valued it as a tract available for cutting up into lots, and placed a lot value

on it.

In valuing the 4.09 acres in description 33, after taking the first row of lots on Washington street, I considered the remainder as part of a much larger tract, and my value of \$180 per acre was placed accordingly; I would have put a higher value if I had considered a second tier of lots south of first tier. I would consider those lots worth \$100 each. In the green part, I would not have put a higher value on the 7.15 acres if considered without regard to the entire 50 to 70 acres; I would figure the next row of lots back from the front at \$50 each, and still drop off from that on the fourth row. second row of lots would be \$600 an acre.

In fixing values, we took into account the location, distance 1089 from center of town, character of buildings and lands in the vicinity, and everything that should be considered. On the Dead River branch, the values I have stated on property adjoining railroad are the prices at which we assessed it.

HORTON.

Recross-examination.

By Mr. Eldredge:

We gave the taxpayer the benefit of the doubt. Lots 3 to 7 inclusive, in Harlow's Add. No. 5, all have buildings on. I valued lot 7 and the east third of lot 6 at \$500, exclusive of buildings. We figured the lots at \$300 each, without improvements. Lot 15 was figured at \$300, lot 16 the same, and 17 to 21 inclusive at \$250 each; lots 8 to 14 were figured at \$400 each, on that side of the street.

In Baldwin's Add., opposite, between Fifth and Sixth Sts. on Baraga Ave., lots 7 to 16 were figured at about \$400 each; between Sixth and Seventh Sts. \$400 on the corner of Seventh, and the balance at \$350. Lots 54 to 59 inclusive are very poor lots. The figures I have been giving are on Rock St.; there is no lot 59 in this addition on Baraga Ave. That would be Hiram A. Burt's Add.

West of Seventh St., on the north side of Baraga Ave., in Harlow's Add. No. 5, the lots are very poor—lot 59 at \$200, 58 at \$100, \$50 on 57, \$75 each on 55 and 54. The committee's valuation on lot 54 was \$50, 55 at \$80 and 56 at \$150; their value included building and lot, except on a few vacant lots. Lots 51 and 52 were vacant lots; on the south side of Baraga, lots 54, 55 and 57 were the only vacant lots. The Committee's valuation on lot 57 was \$50, \$80 on lot 55 and \$50 on lot 54.

In the same addition, between Sixth and Seventh Sts., lots 30 to 37, fronting on Spring St., were put in at \$300 each; on lots 22 to 29 inclusive—the corner lots were placed at \$400, and intermediate lots at \$350. Of lots 38 to 42 inclusive, on Seventh St., between Baraga and Spring, the corner lots were figured at \$300, and the lots between at \$250; none were vacant. Lot 46 on Spring St. was figured at \$150, and lots 47 and 48 at \$100; lots 46 and 47 were vacant. The committee valued them at \$90. Lot 45, also vacant, facing on Baraga, was valued at \$150, lot 44 at \$200, and lot 43 at \$250; none vacant.

Property north of Spring, between Spring and the railroad, and between Fourth and Fifth, we valued at \$20,000; we did not separate them, we included value of improvements. A portion of it is Harlow Park. My values were generally accepted by Tax Commission.

HORTON.

Redirect examination.

By Mr. Wykes:

I think there was one instance in which a reduction was made on protest. Between Baldwin's and Harlow's Add. No. 5, on Baraga Ave., it is just fair—not as good as Rock St. above. Spring St. is very poor; the houses on it front on the railroad property.

On March 26, 1914.

HORTON recalled.

Further cross-examination.

By Mr. Eldredge:

Mr. A. E. Creith did the preliminary work in John Burt's Add.; I reviewed his work. In the field notes for the whole addition, following the description of the property, appear two sets of figures;

the first one represents the 1911 assessment and the second 1091 the 1912 assessment, and in another column, usually in pencil, are the Marquette committee's figures. The third column of valuations is the final price fixed by the Tax Commission.

I was thinking of J. & W. Burt's Add. Mr. Hubbard is the man who made those notes on that (John Burt Add.). I reviewed them. The notes following the the valuations, after each property, are Mr.

Hubbard's writing.

The examiner reported lot 1 of block 1 at \$4,500, and it was assessed at \$4,200 by the Tax Commission. Mr. Twiss and I reviewed the examiner's figures on this plat; where we found it was a little high, we made the reduction. The blue figures are my judgment on that property, made at the time. The Commission adopted our figures in nearly every instance; where they did not, it should appear from the complaints, more than it would on the roll. Unless there has been some complaint, there would be no change.

I have no recollection, in this particular instance, why I did not adopt the examiner's valuations; it was my judgment it ought not to be any higher than it is placed there in comparison with the actual value of the surrounding property. We did not always agree with the examiner. The same examiner reported the surrounding property; I do not know whether there was any change made in that.

The memoranda showing that lot 2 of block 1 was verified at \$3,500 was done by some one previous to the time we went there; the sales put on the year before by Mr. Metcalf; I don't know anything about that. That was a verification of a sale made Sept. 12, 1910, according to the record. That "verified" is misleading. The sale shows \$1,500; evidently, the property was improved after the sale, or borrowed money—something we often find.

The record shows a verification, in red ink, for lot 6 of block 1; verified value, \$2,000; purchased at \$1,500. Mr. Asire verified that at \$2,000. My verified value in red ink cannot have reference to the verification by Mr. Asire.

"Borrowed money" means that they borrowed \$1,500 on some

parcel; it might have covered both parcels; I couldn't say.

Those sales were taken off and that work done before we went to Marquette. These red ink notes mean nothing, so far as my valuation is concerned. They might have influenced us some after our verification. They are not the verified sales to which I testified on my previous examination, only where we verified them ourselves.

The record of those we verified is found on the notes; very often, the verification agrees with the previous one.

I do not remember anything about lot 4, block 2. Very often, on our second examination we found conditions that the examiner did

not find at the time he was present.

The record shows that lot 8 of block 2 was sold on Jan. 4, 1912, for \$2,800. I assessed it at \$2,600, for the reasons that many other properties were assessed-very often we find the man paid more than we consider true cash value; that is, the usual selling price under ordinary circumstances. By "true cash value" I mean the price that the property can be sold at in a reasonable length of time.

We make a distinction between cash sale and sale on time. always inquire into these sales to ascertain whether they were sales for eash or on time. The difference we make varies with the class of property, the length of time, and the rate of interest. Very often, we find property sold on contract for 10% or 20% more than its actual worth.

By "true cash value" I always mean a sale 1093 where the payment was made practically all in cash or as

good as cash, at the time of the transaction.

The "vertified value \$4,000" appearing in red ink, opposite lot 9 of block 2, means that one of the examiners might have placed \$4,000 on it at the time Mr. Metcalf was there. The work was done in the middle of the winter, when the property was not in the shape it was in later on. These examiners were supposed to be capable of arriving at the true cash value; they were working under a disadvantage at the time, on account of weather conditions. reviewed the property later on, when the conditions were different. None of the examiners were residents of Marquette, nor familiar with Marquette properties and values before they went there. Mr. Metcalf went a year before we did. There is a note there to the effect that our own examiner reported to us that that property was low at \$4,000.

The memoranda in red ink opposite lot 23 of block 2 indicates that a sale price of \$2,900 on that property was reported to me on

April 9, 1912.

I assessed the property at \$2,350; I considered that was all it was worth. I do not remember that instance specifically. Very often, we find a man buys on long time and gets his deed later on. Those records in red ink show the price of the contract; it shows in the deed perhaps 8 or 10 years later. It does not appear whether it is a sale on contract or not. The contract price is put in the deed sometimes five years after the sale. I am not saying that it would represent in my judgment a value five years before. If a man paid that in cash five years before, and the property and conditions remained the same, it would have some effect in showing valuation. If he paid it in cash, secured it on the property, and paid interest on it, there would be a difference according to the conditions under which

he purchased it in the first place. The fact that this was 1094 reported as a sale at \$2,900, and then verified at \$2,900, means that the party may have paid on contract; we have no way of knowing, without seeing the party himself, which we always do

before accepting a verification.

The liber and page following the amount at which verified refers to the record in the Register of Deeds Office at the time the deed was I am not saying the party did not pay \$2,900; I said possibly it might have been; I do not know. We do find those circumstances in general instances where a man has bought on contract; sometimes \$1,000 more than the property is worth; it goes on record, when he gets his deed, at the amount placed in the contract.

I valued lot 6 of block 3, same addition, at \$7,500; the examiner valued it at \$7,000. I remember the property; it is on the corner of

Third and Ohio Sts.

I had a sale showing purchase price of \$1,650 on lot 10 of block 3; I valued it at \$1,500. I remember Mr. Begole's property at Marquette; there was no question when I valued it, nor is there

now, as to whether it was valued at its true cash value.

The notes on the east 75 feet of lot 6 of block 4 show that the examiner reported that the owner said he would not sell for less than \$10,000, that he had been offered \$10,000, and that in the examiner's judgment it was worth \$8,000. That later appeared before the Commission; the figures were fixed on account of the owner being a widow; she was given some concessions on that Those figures were fixed by the Commission and not by me; I couldn't say what figures I fixed; they have been erased.

I couldn't say whether it was because the owner was a woman or a widow; that was left to the local Board of Review. the recommendation of the assessor that that amount was

reduced. I couldn't tell in whose handwriting the word 1095

"woman" is: it is not mine.

I remember the Hargrave Flats on lots 1 and 2 of block 5, and the considerations that induced me to reduce it from \$42,000 to \$40,000.

I don't recall lot 9 of block 5, belonging to Annie J. Connell; the value placed upon it was not reduced because the owner was a

woman.

The blue figures were the figures I reported to the Commission, except where changed by them; the exemptions for widows, etc., were on the recommendation of the local Board of Review and It has been the rule to follow their recommendation. assessor. They have a list of widows who have been partly exempted; we had access to that, and also took it up with them, to see if they still thought there ought to be the exemption.

We fixed the amount of exemption upon their recommendation: we considered what they commended, and then used our judgment. We invariably made an examination to find whether these parties were able to bear any part of the burden of taxation or not. We did not consider we had a right to exempt them in whole or in part.

Opposite lot 12 of block 7—name, John P. Kern, now dead—the value fixed by the committee is \$2,500; our value is \$1,500, part exempt. Our recomendation to the commission as to exemptions

for widows and other poor people was sometimes for the whole, and

sometimes in part.

I cannot tell what lot 3 of block 12 of John Burt's Add. is assessed at; the description is (reading from notes, a two story upright, wing and lean-to, stone foundation, steam heat, hardwood floors, grate, hardwood finish below, 15 rooms, all modern,

1096 near car line, good, low at \$4,800. The assessed valuation is \$4,800; Mr. Twiss made it. Property in that neighborhood is fairly desirable property, as I remember it. We usually take into consideration, in valuing a property, the number of bath rooms it has. The examiner said the property was low at \$4,800; Mr. Miller's O. K. was that \$4,800 was the cash value. He is an attorney connected with the D. S. S. & A.

Mr. Miller appeared at the review in several matters, I believe. I was also present. We had already arrived at the true cash value; Mr. Miller O. K.'d it; he took the matter up with his clients, and it was agreed on at that time. I couldn't say that we reduced any

values on the representation of Mr. Miller for his clients.

The examiner was Mr. Hubbard; he reported it low at \$4,800 at the time he made the examination. In my judgment, it was not low at \$4,800, as I remember. I don't remember that particular property

now. Mr. Twiss put those figures on there.

I couldn't say whether property in that neighborhood has increased or decreased in value in the last year, or for some years prior to the time I was there; we made our valuation on the condition we found at the time. Very often, where we thought necessary, we made an examination to find what the property cost other than as noted on the report covering John Burt's Add. That record is in the field notes.

Lot 24, Block 8.... 2,900

1097	Sale	Valuation	
Description.	price verified.	or assessment.	Remarks.
Hargrove Apartments			Sale only indicated cost of lots, and all the improvements, which were the greater part of the property; were put on after the purchase.
Lot 9, block 1	. \$2,500	\$2,800	Verified 5 years before.
Lot 6, block 1		2,000	Purchased 5 years before at \$1500. It says borrowed money, though I couldn't say that was the purchase price; simply a record our card shows that other people verified, borrowed money at \$1,500. It doesn't show the purchase price at all.
Lot 4, block 2	1,000	1,500	Verified 4 years before.
Lot 4, block 3		2,000	The deed called for \$1; verified by the owner at \$2,000. We don't take the record for it entirely; we go to the people and find out
		,	what they paid for it. Our note shows we found the purchase price to be \$2.00. I guess it says "not verified"; I got it mixed.
East 1/2 Lot block 8, and	all	4.300	

We verified the price paid for the property, the conditions of the sale, etc. It has been the custom to use that word "verify" after an examination of the property and interviewing the buyer and seller or someone who knows the actual consideration. I use the word "verify" as meaning to ascertain the actual consideration. We take the sale, to locate the property and the people. It is a verification of the sale, and not the actual price alone I don't consider myself bound by the price as showing present value; the conditions may

3,000

have changed.

I do not recall anything about lots 5 and 6 of block 8.

The figures, \$3,000, opposite, are mine. As to the statement that it was purchased in 1908 at \$1,000, and verified at \$1,000, that is what they paid at that time. The words "verified value, \$3,600" are not my work, at all, but that of some one employed by Mr. Metcalf. That is not true throughout the report I made to the commission concerning John Burt's Add.; some of those sales were taken the year previous and verified during the winter, at the time we were there copying the rolls.

I couldn't point out the sales, the records of which were obtained by my assistants or myself, in that book. The handwriting in red ink was all by the same man. It was a matter of record before we did any examining in Marquette only some sales were verified the year before we went there by Mr. Metcalf and his assistants; those cards were put with the sale cards we had when there, and they were all put on the book at the same time, by the same man, who knew nothing about the sales, but was simply acting as clerk.

Mr. Wykes: I don't want this record to stand, as it does, that Mr. Horton has looked through that book and given the only description where the value actually placed was either equal to or above the verified consideration, because he has not gone through the book.

Our force went there in February, 1913. In examining the sales record, we only had to cover 1912, but we investigated all the sales appearing on this book; but, in some of them, the notes were made on cards and entered here as verified by Mr. Metcalf and his assistants, and I cannot distinguish between the two from the writing. After the cards are placed on the book, sometimes they are sent back and sometimes not. They are simply taken on the cards to

1099 get them off the records, on to our field books.

(Witness testifies as to various descriptions, sales as reported, verified value, verified sale, and valuation and assessment of same, as follows:)

		a. v.	4110										
	Remarks.	Bought 3 years ago on con- tract.	No bearing on value.	Already testined as to man.	No tendency to determine	present value.	Aiready testified as to that.	Clerk wrote "verified" when	he should have put value only. I think that is examiner's opinion as to	value. Combining that amination and ours, it is misleading. The notes in red ink are sometimes misleading.		Lot alone cost \$1,275 in 1908. Our examine reported the premises low ported the premises low	11 41,000 III 1910.
Авнеяв-	ment.	\$2,700	:		•	•					0 0 0 0	\$3,500	\$2,350
by-	Our force.	*		:	:		:				\$2,600	•	:
Present valuation by-	Metcalf. Our force.	:	:	•				69.500	our read		:	:	
Presen	Owner.	* * * * * * * * * * * * * * * * * * * *		:	:				•		0 0 0 0	* * * * * * * * * * * * * * * * * * * *	:
d.	Sale.	•	:	:					0 0 0		0 0 0 0	•	:
Verified.	Value.	t3,500 by our	•	:					* * * * * * * * * * * * * * * * * * * *		:	:	0; 0; 0; 0;
	Sale as	\$1,500 in 1910.	:		:				\$1,500 on Dec. 1, 1911.		Sale in 1910: \$2,800		\$2,900 In 1912.
1100		Lot 2, Blk. 1, J. Burt's Add.	Tota 4.5 Bik 1	Lot 6, Blk. 1	Lot 9, Blk. 1	Lot 16, Bik. 1		Lot 4, Blk. 2	Lot 7, 31k. 2		Lot 8, Blk. 2	Lot 9, Blk. 2	Lot 23, Blk. 2

	Remarks.	Not able to verify.		red show 00; in m this is va	aminer under Metcalf found. I couldn't say whether it shows sale at that price.		Improvements made since then.	,	Assessed after more thorough examination.		There must have been improvements after purchase.
	ment.			•		\$2,500	:	\$1,800	\$3,900	\$1,800	\$2,500
by-	Our force.	:		* * * *		* * * * * * * * * * * * * * * * * * *	:	0 0 0	\$4,500 by our ex- aminer.	:	:
Present valuation by-	Metcalf.			:		•	:	:	\$4,000	:	•
Prese	Owner.	:		•		\$2,850 veri- fled.	:	:	* * * * * * * * * * * * * * * * * * * *	e 0 0	:
led.	Sale.			:		:		:	\$2,800 by Met- calf force.	0 0 0 0	:
Verified.	Value.	:		•		•	•		•	*	:
Sale as	reported.	13		\$1 in 1900.		\$1,000 in 1912.	\$1,825 In 1908.	\$2,100 on Sept. 11, 1910.	\$1 in 1909.	\$2,450 in 1912.	\$1,650 in 1910.
	Description.	Next sale	1101	Next sale		Next sale	Lot 8, Blk 5	Next sale	Lot 9, Blk. 5	Lot 11, Blk. 5	Lots 19-20, Blk. 5

		Verified.	led.	Prese	Present valuation by-	n by-	Assess-	
Description.	Sale as reported.	Value.	Sale.	Owner.	Metcalf.	Our force.	ment.	Remarks.
Lot 1, Blk. 6	\$2,000 on April 27, 1911.	:	:	•	:	:	\$2,000	
Next sale		•	•	:	:	į	\$2,900	
Lot 7, Blk. 6	\$3,500 in 1908.	:		\$3,500	\$3,000	\$3,000	:	
Lots 1-7, Blk. 6	:	:	:	:	* * * * * * * * * * * * * * * * * * * *	:		No tendency to show pres- ent value.
1102 Lot 10, Bik. 7	\$2,600 on June 14, 1912.	1	\$2,000	:		•	\$2,800	Our examiner reported about \$800 in improvements since sale. The assessment was after \$1 sale; property deeded for \$1 and money borrowed to make improvements. The \$2,600 sale
W. 3714 ft. E. 1/2 Lot 10,	\$2,400 in 1907.	:	:	:	:		\$2,000	after improvements made.
Lot 15, Blk. 7		•	:		:	:	:	\$2,500 borrowed money; no tendency to show value.
Lot 3, Blk. 8		:	:		:		:	Ditto.
Lots 5-6, Blk. 8	Sale in 1906.	:	•	:	•	:	:	
Lot 7, Blk. 8	. Ditto 1909.	:	•	•		•	•	Vacant lot.

	Sale as	Verified	ed.	Presei	Present valuation by-	n by—	Assess-	Domarko
Description. Lots 12-9, Blk 8	\$4,000 on Sept. 26, 1908.	, aine.	-arec		mercan.	\$4,300		Notice 185.
W. 1/2 lot 13 and E. 1/2 lot 16, Blk. 8.	\$3.200 In 1909.	:	:	:	:	:	\$2,500	
Next sale	\$3,000 on Feb. 28, 1912.	:	į	:	:	:	:	
Lot 22, Blk. 8	\$2,800 in 1912.	0 0 0 0	:	•	:	\$2,400	:	
Lot 24, Blk. 8	\$2,900	•	:	:	•	\$3,000	:	
Lot 1, Blk. 9	\$1,800 on April 30, 1908.	:	:	:	į	:	\$1,800	
Lot 8, Blk. 9	\$2,000 on Dec. 28, 1908.	\$3,000 by Met- calf's force in 1912.	\$3,500 by Met- calf's force.	<u>:</u>	\$3,000	\$3,300	83 ,300	Metcalf's force found it worth \$3,000 in Dec., 1912. We valued property at \$3,300 at the time we made our examination, Mar. to May, 1913.
Lot 9, Blk 9	\$1,000 on April 7, 1908.	:	:	•	\$2,750	•	\$2,700	
Part Lot 1. lying west of E. line of lot 3 produced, and Lot 3, Blk. 10.	\$6,000 on Sept. 1, 1908.	:	:	\$6,000	\$5,000	\$4,200	\$4,200	Our value at time of examination. Notes as to \$6,000 valuation by owner were made by Metcalf force.

	Sale as	Verified.	(Prese	Present valuation by-	Present valuation by-	Assess-	Ren	Remarks.		,
Description. reported. Lot 3 and 5 ft. of Lot 4, \$6,000 Blk. 11. on Sept.	\$6,000 on Sept.	Value.	Sale. \$5,750	Owner.	Metcall	Our ronce.	\$5,500	Assessment based on terms of sale.	based	g	erms
W. 1/2 Lot 12 and E. 12 ft. Lot 12, Blk. 11.	\$2,000 on Feb. 26, 1908.	:	:	:	:	:	\$2,300				
W. 37% ft. N. 85 ft. Lots \$1,650 17-18, Blk. 11. 24, 1908	\$1,650 on Sept. 24, 1908.	•	\$1,650 by Metcalf.	:	:	\$1,600	:				
W. 17 ft. Lot 5 and E. 32 \$5,500 ft. Lots 6-7, Blk. 12. on Aug. 24, 1910.	£3,500 on Aug. 24, 1910.	:	\$3,500	:	:	•	\$3,500			;	
Sale in Blaker & Bacon's \$3,000 Subdivision. 20, 190	\$3,000 on Dec. 20, 1909.	:	•	:	:	:	\$3,500	\$3,500 A part of John Burt's Aud., I think.	onn is	E	Add.,

1104 I made the examination of Harlow's Additions 1, 2 and 3 inclusive; the notes are all mine, except verifications carried over from cards, through the entire book. The sales appearing in red ink and those made prior to the fall of 1911 were verified by Mr. Metcalf's men during the winter of 1911.

Harlow's Add. No. 5 was examined by F. E. Bush, and the work approved by myself. Lots 1, 2 and 3 of Nester's Add. No. 1, were examined by both Mr. Twiss and myself. We did not follow the

committee's valuations in all cases.

(Report covering Harlow's Additions 1, 2 and 3, pages 71 to 83 inclusive, offered in evidence and marked Complt.'s Ex. 90, Horton, March 27, 1914; also report covering Harlow's Add. No. 5 offered in evidence and marked Complt.'s Ex. 91, Horton, March 27, 1911; also report covering Nester's Add. No. 1 offered in evidence and marked Complt.'s Ex. 92, Horton, March 27, 1914.) (Objection by Mr. Wykes so far as they are not lands nearby or adjacent to the railroad, and not shown to be such.)

Yesterday, the values I placed upon certain lots, separate from improvements, in Harlow's Additions 1, 2, 3 and 5 were from memory and my having access to the maps of that plat accompanying the record. The map accompanying Complt.'s Ex. 90, Horton, which covers Harlow's Additions 1, 2 and 3, is supposed to be a map of the plat of those additions cut from a map of the city of Marquette compiled by E. A. Johnson and J. S. McCarthy, dated in 1894; I think they are the same.

The map refers back to the location and time I did the work; it only refreshes my memory. That is not true of Complt.'s Ex. 92, Horton, Nester's Add.; but values are given there in the majority of

cases. An inspection of the exhibit will show those values separately, wherever they are given. In Harlow's Add. No. 5, where the notes show improvements on the lot, I rely upon memory for the value. There are also vacant lots listed there.

HORTON.

Redirect examination.

By Mr. Wykes:

(Board's record of field notes and assessments on John Burt's Add. marked Defts.' Ex. 51, Horton, March 27, 1914.) On that exhibit the second column shows the committee's valuation in dollars; the third column, in blue pencil, is the Commission's figures; that is, our recommendation as to the value of that property as adopted by the Commission. Where the Board did not adopt our figures, they were changed to correspond with the value agreed upon by the Board, so this record would not entirely show our recommendation in those instances. This exhibit was made previous to the assessment roll, and is the data upon which the official roll was made up.

The local assessors still make their assessment roll, in which they

place their estimate of the value of property; these exhibits are parts of a roll prepared by, or under the direction of, the Tax Commission, and the changes made by the Commission in the local valuation are put on the local rolls, in a column provided for them; with that exception, each valuation is carried out by the Commission, whether there is a change or not.

I find among the Commission's records seven protests against high valuations in John Burt's Add., nine in the Harlow Additions, and 62 in Marquette city, entire. I find a protest for the corner of Front and Baraga, by Mr. O'Meara; also for the northwest corner of Front

and Washington.

Between two men, assumed to be equally competent, valuing a piece of property independently for the same purpose, I wouldn't consider a difference of 10% between them unusual. I would regard as unusual a variation in values from

\$10,500 to \$39,000 for the same property.

There were building- on the lots in John Burt's Add., as a rule, and in fixing our values, the condition of the buildings was always taken into account. Assuming a sale in 1908 and a valuation in 1912 or 1913, without repairs, I would not regard the building worth as much in 1913 as in 1908. Assuming the ordinary repairs, painting, etc., it might be worth as much, and might not. I recall no peculiar conditions relative to valuations in John Burt's Add.

I couldn't say whether I investigated to see whether land had increased or decreased in that particular addition. Taking into account the things called to my attention by Mr. Eldredge, there is nothing that would lead me to change my judgment on the plat as a

whole.

The field man's work was done in Marquette during March and the first of April; my work was done in May. May would be the better time to make a complete inspection and examination in that section of the country, where the snow hinders more or less.

HORTON.

Recross-examination.

By Mr. Eldredge:

Of the seven protests in John Burt's Add., five were over-ruled by the Board; in one instance, they reduced to \$2,500 a property which we recommended at \$2,700; and in another, from \$2,500 to \$1,500, part exempt, on the recommendation of Mr. Primeau, City Assessor; that is, they exempted a part of the value I had included. sons for making the complaint, are that the owner is a widow; owns another house, that rents for \$16 a month; owes \$550; son

Board of Review reduced and daughter at home pay board. 1107

value because of circumstances.

Of the 62 protests in Marquette, two of them related to personal property; one of them is marked no protest, and the other is marked assessed at \$65,000.

1108

On March 25, 1914.

FESTUS R. METCALF, a witness called by defendant.

Direct examination.

By Mr. Wykes:

I live in Adrian; I am 66 years old. I am in the service of State Board of Tax Commissioners, and have been for 10 years. My work at present is mostly corporation valuation. I have done all kinds of work for the Tax Commission; I started with farm work, but have been doing nothing but business, city and village property for four orfive years; almost exclusively on corporation work the last two years. When I view business property in a city, the foreman usually works with me; that is, foreman of a force of field men; with corporation property. I work alone.

I did no re-assesment work in Baraga. Two or three years ago, I had a force of six men doing preliminary work in Marquette. This was additional to work done by Mr. Horton. The local committee was appointed while I was there, and the Commission had me examine and verify all sales made in the two years, and use it as supplemental to their work; I put no figures on property that year.

When I go to a place to value property, I first get the judgment of the people who live there. We have used sales to verify our judgment, but the general consensus of opinion of people dealing in real estate fixes the value of it, taking into account bids, offers, sales, etc.

The first I knew I was to testify in this case was about two weeks

ago.

METCALF.

Cross-examination.

By Mr. Eldredge:

There is no secrecy about our work when we go into a town to begin valuation work; everybody knows we are trying to find valuations for taxation purposes. In my experience, public opinion is the strongest factor in establishing land values; that is the opinion of those who own and buy and sell.

METCALF.

Redirect examination.

By Mr. Wykes:

I get the expression of that opinion in part from actual sales; also bids and offers.

On March 25, 1914.

1110

J. R. Davis, a witness called by defendants.

Direct examination.

By Mr. Wykes:

I live in Lansing; I did live in Bay City; I am 40 years old. I have been with Tax Commission for 10 years; left them in January, 1914. I was employed by Tax Commission for four years, at general office work and assisting some on outside, part of the time; next two years as a clerk on field work, and part as examiner, and the past four years as examiner; on outside work exclusively for three years.

In examining property, I placed valuation on it. My first work in placing values was in Grand Rapids about eight years ago, on equalization work, assisting Mr. Parker; that was getting data to give to State Board of Equalization. Three or four years ago, I worked in Charlevoix County, assessed Boyne City, and assisted as examiner in general work through the county. I also did some readjusting of valuations in townships; that would involve finding the cash value of the different districts. Two years ago, 1912, I worked in Ironwood; made examination there with Messrs. Horton, Hubbard and Mansfield. I also worked in Bessemer, Iron River, Iron Mountain; then, in Jan. 1913, Marquette County appraisal, assisted by Messrs. Keita and Hubbard.

I went to Marquette County in April; I assisted in Marquette city, and worked between Negaunee and Ishpeming and other points in the county until the latter part of August. Mr. Hubbard and Mr. Keith were with me all the time. In our work of reaching values for assessments, we gathered what sales we could, interviewing the people, in general, and endeavoring to find out what we considered a true basis of value. I got my information largely from business men, but discriminated against no one, and met anyone interested and intelligible.

gent on these matters. Our purpose throughout the work in 1111 Ishpeming and Negaunee was to reach true cash values.

My work had to do with surface values only; I did not take in mineral values. I have not checked the few differences between the figures I recommended and those that went on the assessment roll.

Beginning at the east line of Negaunee, the figures placed on the assessment rolls by the Tax Commission from my examination are: westerly through the S. W. ¼ of Sec. 33-48-26, \$12 an acre; through the S. E. ¼ of Sec. 5-47-26, \$25 an acre; N. W. ¼ of Sec. 5, \$800 per acre; N. E. ¼ of Sec. 6, \$2,000 per acre; N. E. of S. W. of 6, \$2,500 per acre; N. W. of S. W. of 6, \$7,000 per acre (that refers to both sides of track); S. E. of N. E. and N. E. of S. E. of Sec. 1-48-26, \$1,000 per acre; northwesterlythrough balance of Sec. 1, \$40 per acre; S. W. of S. W. of 32-48-27, \$40 per acre; I think that carries you to the west line of city of Negaunee; the business part of Negaunee is in the N. W. of S. W. of Sec. 6-47-26, at \$7,000 per acre.

From we't line of Negaunee the figures through the S. ½ of S. E. of Sec. 2-47-27 are \$75 per acre; S. ½ of S. W. of 2, \$35 per acre; S. E. of S. E. of 3, \$300 per acre; S. W. of S. E. of 3, \$2,000 per acre; N. E. of N. W. of 10, \$8,000 per acre (practically in center of Ishpeming); N. W. of N. W. and S. W. of N. W. of 10, \$2,000; S. E. of N. E. of 9, \$200 per acre; N. W. of S. E. of 9, \$35 per acre; S. W. of S. E. of 9, \$135 per acre; and balance of Sec. 9, to west line of Ishpeming, \$40 per acre. That is as far as I went through; further on are figures taken from assessment roll.

The figures up to this point are the result of my work, assisted by Mr. Keith and Mr. Hubbard, and they were my judgment of the true

cash value at the time reported and now.

No surface value was taken at Champion; that is a mining proposition, solely, and was assessed as such. I can give no separate values there, except as to my judgment of the values of property.

At the time I made these figures, I had no intimation that I might be called upon to testify in this case; I first learned that I should tes-

tify about a month ago.

Of the lots and assessments that went into the \$7,000 area in Negaunee, the land value, from lot 1 on north side of Iron St. to intersection of C. & N. W. railroad, is \$100 to \$150 a foot. These lots are 33 by 130; they face two streets,—that is, they extend through to an improved street,—so that they have two building sites frontage. I think it was the values between there and the railroad that fixed the \$8,000 value. On the south side of Iron St., from Gold St. easterly to intersection of C. & N. W. road, the lots would average about \$100 per front foot. From the C. & N. W. tracks, on south side of Iron St., to Pioneer Ave., the lots directly across from those \$150-a-foot lets ran from \$75 to \$95 a foot.

On March 27, 1914.

DAVIS, recalled.

Further direct examination.

By Mr. Wykes:

The figures I gave you were my average of the assessed values in those districts along the line of the railroad. They were not exact mathematical averages; I just applied my judgment on the territory as I went through. I took the assessments on both sides of the right of way. The figures would be the average value according to my judgment; it would, in a way, be my average of the assessments. In other words, my judgment of the value and the valuation of the assessments were practically the same.

As to the property north of the reilroad, in the vicinity of Iron St., at Negaunee, on the east side of Gold St., there are three lots back of the south side of the main business part; on the west side, two lots, fronting differently; on the west side of Silver St., four lots; and on the east side, five lots, running parallel with the

alley, facing Silver St., and between that and the C. & N. W. tracks; on the west side of Marquette St., five lots, and on the east side, four The four lots would be about four and a half regular lots, as lot 65 is a wide lot. At Pioneer or Division St., there are three lots on the west side; the east side is taken by the city fire department That is the east end of the business district. On the east side of Silver St. are four or five lots that run into a corner 210 feet on Silver St. and 200 feet on the railroad, about .48 of an acre.

I verified the Winter & Suess sale, on that, at \$2,200. There was a peculiar condition in that sale, which I might explain. The gentlemen buying the property supposed they were buying lots 45 and 74 to 78 inclusive, which would make the complete property between Silver St. on the west, the C. & N. W. right of way on the east, and the D. S. S. & A. on the south, but, when they came to record their deed, it did not include lot 45, a very small "v" shaped lot close to Iron St., but with no outlet on it, and they were forced to pay \$300 for this lot, to complete the property, making the total paid \$2,500, including the point,

There is no business south of the railroad in that immediate vicinity, except on the extreme east end of the property we have been de-

scribing; that is Pioneer Ave. as continued.

The assessments on the land south of the track would average about \$400 per lot; a little less directly south from the section line of 1 and 6 to the west 1/8 line of 6. It would be a tier of lots on the east side of Gold St. and then easterly through to Silver, Penin-

sula and Bay de Noquet, and Division or Pioneer Ave. extended.

I found the highest values in Negaunee on the north side of Iron St., between Pioneer Ave. on the east and the C. & N. W. right of way on the west.

DAVIS.

Cross-examination.

By Mr. Eldredge:

The value on lots 61, 62, 63 and 64 of the Pendell plat is \$40 per foot frontage; they front on Division St.; that is a continuation of Pioneer Ave.—a narrow street. They are 105 foot front on Division St. and 100 feet deep. Lot 64 is smaller; I think it only has about six feet on Division St., so that 10,125 feet area is nearer right than 10,500 feet. The valuation of that property was \$4,000. The 125 square feet would amount to \$17,205 an acre, we figured. That 10,-

I cannot give the original size of lot 105, on the east side of Gold St., immediately south of the D. S. S. & A. It is apparently all taken up by the railroad, here, on the map, and what part was not taken up by the railroad was used as a driveway on the south side. It was assessed at \$300. My notes on it read: "Is vacant and used as a drive-

way." I assessed it as a lot, as I saw it, \$300.

I assessed lot 108 on Silver St. at \$300; as I remember, it was cut on the northeast corner by the railroad. My value was on the portion outside of the railroad; I don't know how much. These lots are 50 by 150 feet. I assessed lot 119 on cast side of Silver St. at \$300 for that part south of the railroad; I do not know how much it was. Maitland's Add. was in existence then. I assessed lot 1 of lock 2, there, at \$1,000; lot 15 at \$600. Lot 1 is 50 by 120 feet; lot 15 is 51.55 by 120 feet.

1115 I assessed lots 1 to 7 inclusive of block 29 of the Pioneer Add, for \$1,800, as an entirety. Lots 4, 5, 6 and 7 were about six feet below the street line—a garden spot; lots 1, 2 and 3 faced the railroad on the south—very rocky. There was some personal property on those lands, small cottages and shacks, scattered along the railroad. I don't remember of any rock blasting going on in lots 1, 2 and 3; I think that was further west, on blocks 17, 18, 28 and 29. The entire south part of block 29, between Healy Ave. on the east and Brown Ave. on the west, is a bluff.

(Map of Negaunee offered in evidence and marked Complt.'s Ex. 93, Davis. Mr. Wykes admitted that red line in map marks southerly limit of D. S. S. & A. through Pendell Plat.)

Lots 1 to 17 inclusive—that is, the entire south side of block 28,—is rock bluff. The city has a stone crusher on lots 4 and 5. Lots 1 to 9 inclusive, the south side of block 17, are all very narrow lots; they might run into the bluff on the east side; part of that was used for gravel pit. The property of D. S. S. & A. in front of blocks 17, 28 and 29 was assessed at \$275 an acre; I valued it at that.

I found a small part of the D. S. S. & A., immediately south of Lots 4, 5, 6 and 7, and perhaps lot 3, of block 29 of the Pioneer Add., had been abandoned. I valued the land between that abandoned right of way and the new, south of it—that is, between the Maitland and Reed & Winters Additions and the present right of way,—at \$5,000; that is for the entire; that includes land both north and south of the present right of way between Healy Ave. and the Maas & Lonsdorf Add. For south of the track, the description reads: That part of the S. ½ of the N. E. ¼ lying south of main line of M. H. & O. railway west of west line of Maas, Lonsdorf & Mitchell Add. of Negaunee, and east of the extension of Healy Ave. continued. That is 10 acres, there.

I valued the right of way across the N. W. of the S. E. of Sec. 33-48-26 at \$10 an acre; N. E. of S. W., \$10 per acre; S. E. of S. W. \$12 per acre; and S. W. of S. W., \$12 per acre. The next 40 on that (south) line would be the S. E. of S. E. of Sec. 32, at \$30 an acre; the entire S. ½ of S. ½ of S. E. is set at \$30 an acre. These figures represent the present value of this right of way, in my

judgment.

In Sec. 5-47-26, I value the N. E. of N. E. at \$15, N. W. of N. E. at \$15, S. W. of N. E. at \$40, and S. E. of N. W. at \$800 per acre. I made my examination, on which I based these prices, in the summer of 1913. I knew this right of way had been recently purchased, but had never investigated it. I don't remember any sales in Sec. 5. As to this sale for railroad purposes, I knew nothing about it, and made no effort to find out.

As to this land just valued at \$10 per acre, it is a question as to for what purpose it would be worth that; part of it was rough cleared. I valued the lands that the right of way runs through-approximately the same kind of lands; not the right of way itself.

In Sec. 5, the Pioneer & Arctic Iron Co. owns the S. W. of N. E.;

the S. E. of N. W. is all cut up in small descriptions.

The land I valued at \$800 an acre is pretty fair land, with good building spots, valuable for lot purposes. The land I valued at \$40 an acre was mostly unimproved, some stumps and stone; fair land; the balance was cut up by railroad and swamp. There are about 12 acres in that 40 of no value except for railroad use. I valued that 12 acres at \$80 an acre.

On the south line (of 48-26), I valued the S. E. of S. E. of Sec. 33, at \$10, S. W. of S. E. at \$10, and S. E. of S. W. at \$12, per acre. In sec. 4-47-26, I valued the N. E. of N. W. at \$10, N. W. of

1117 N. W. at \$10, and S. W. of N. W. at \$10, per acre.
In section 5-47-26, I valued the S. W. of N. E. at \$40, on an average, S. E. of N. E. at \$12, N. W. of S. E. at \$20, and N. E. of S. W. at \$800, per acre. I don't think I valued the S. E. of S. W.; I think that is a mine; it is assessed as a mine. I think the surface rights were not assessed. I think that is a part of the Queen group of mines; there is no assessment on that, except as a mine. I valued that part of the S. W. of the S. W. lying south of the main track of the C. & N. W., except the L. S. & I. right of way, at \$50 an acre.

I assessed lot 82 of the Iron or Pendell plat, separately, at \$1,500; it has 45 feet frontage on Silver St. I assessed lots 83 and 84, together at \$60 per front foot for the lots; lot 39 at \$125, and lot 40 at \$100, per front foot. Those two lots were assessed against Benjamin Neeley. They had buildings on them. Lot 39 had 33 feet frontage on Iron St., I think, and lot 49 the same. I assessed the

entire property at \$20,000.

I assessed lot 87 at \$1,200, lot value—I couldn't answer as to its frontage. Lot 86 at \$60 per front foot for 33 feet; that is on the west side of Gold St. Lot 87 has about 22 feet frontage on Gold St., I think; I didn't think the value was as good there.

DAVIS.

Redirect examination.

By Mr. Wykes:

I assessed the business district by the front foot; the larger tracts south of the railroad track as lot value.

At Ishpeming, I placed an average valuation outside the right of way between Third and Lake Sts., with the exception of a certain tract in the center, at \$8,000 an acre. The tract in the 1118 center, between First and Pine Sts., would be worth \$12,000

As to lots adjacent to the railroad track in that neighborhood, I valued lot 124, the first lot south of the railroad, on First St., at \$45 per front foot. There is no lot 125; it is a street. Lot 116 is railroad property; no assessments on that. Lot 117 belongs to the city; no

assessment on that. Lot 118, the same. Lot 119 at \$40 a front foot.

Lots 120, 121 and 122 are divided the other way, with frontage on Cleveland Ave., at \$60 per front foot, 105 feet deep. I assessed those lots. Lots 120, 121 and east 35 feet of lot 122 are assessed to the Upper Pensinsula Brewing Co.; east 35 feet of west 70 is assessed to Crowley: west 35 feet is assessed to Mine Workers Union. Lot 114 faces Main St.; value \$150 per front foot. Lots 113 and 112 at same price.

Lot 111, adjoining the railroad, is assessed at \$100 per front foot; it is given as a metes and bounds description with a frontage on Main St.; amount of frontage not given. I assessed it as 35 feet frontage; total, \$3,500. I paced it off. There might be a difference as to where

the line came in that right of way.

The Assessed values from the west limits of Marquette to the east limits of Negaunee (north line) are as follows:

From	West	Line	of M	arquett	e to	Mile	Post	157,	\$50.00	per	acre.
	Mile			•	44	44	64	158,	20.00	- 66	44
44	44	44	158		66	44	44	159,	15.00	44	44
66	66	46	159		44	44	4.6	160,	5.00	44	44
66	44	44	160		44	44	44	161,	3.50	44	66
44	44	44	161		44	44	44	162,	4.00	44	44
66	46	44	162		44	44	44	163,	6.00	44	44
66	44	44	163 t	o East	Line	e of	Negai	inee,	6.00	46	44

1119 On the south line, they are:

From West Limits of Marquette to Mile Post 4, \$10.00 per acre.

44	Mile	Post	4		-								
66	44	44	5				44	44	44	6,	5.00	44	44
44	44	44	6				44	44	44	7.	4.00	44	44
44	66	44	7				44	44	44	8.	4.00	44	66
44	44	44 -	8				44	44	44	9,	5.00	44	44
64	66	66	9	to	East	line	of	Ne			8.00	66	66

These are the assessments on each side reduced to the acreage assessment, extending 80 rods on either side, across the first 40 on either side of the track.

The assessed values per acre on lands each side of the road, from the west limits of Ishpeming to Baraga County line, are:

Mile post.	Value	Domonko
From-To-	per acre.	Remarks.
172 173 173 174 174 175 175 176	\$8,00 7,00 5,00 5,00	
176 177	5.00	
Low Moor Farm	12.50	
177 178	7.00	
178 179	5.00	
179 180	7.00	
180 181	5.00	Humboldt
181 182	15.00	Humboldt
182 183	7.00	
183 184	5.00	
184 185 185 186 186 187	$\frac{5.00}{32.00}$	Champion Mine
186 187 187 188	5.00	
188 189	3.00	
189 190	4.00	
190 191	3.00	
191 192	3.00	

The figures I have given are Tax Commission figures; they were taken from the field books of the Board of Assessors. These figures were on the bare land. I couldn't say whether there were no structures, or whether there were some and they were excluded. There is a possible chance that those figures were changed.

I cannot say that the figures on the field books are the figures placed on the assessment rolls.

Mr. Eldredge: The figures of witness may stand as the Tax Commission valuation, but I do not waive my objection to the competency of Tax Commission valuations to prove the true value of the land.

DAVIS.

Recross-examination.

By Mr. Eldredge:

I valued the lots on Church St. lying immediately north of the north line of D. S. S. & A., just west of First St., exclusive of improvements, at \$35 a front foot; that covers all the lots on the south side of Church St., between Main and First Sts.

Lots 1, 2 and 3 of block 2, fronting on Main St., valued at \$80 per front foot. This value includes lot 4, also. They were laid

out originally facing Canda St.

From First St., on the west to Pine St., I placed an average value

of \$12,000 an acre, and from First St. east to Third St., \$8,000 an acre. I would value the land occupied by the D. S. S. & A. passenger and freight station, terminals and right of way between those two points at \$8,000 per acre.

I valued lots 133, 134, 135 and 136, on Second St., sold to the Government for a post office site, at \$35 a front foot, exclusive of buildings. My total valuation on the four lots was \$6,000, and

\$3,000 on the buildings, making \$9,000 on the property.

1121 In getting at my average of \$8,000 in Ishpeming, I used the values on and adjacent to the railroad, abutting on it. I valued lot 145 on the opposite side of Second St., at \$25 per front foot; it is lower than on the other side.

DAVIS.

Redirect examination.

By Mr. Wykes:

The frontage on Main St., immediately north of the railroad and corner of Canda St., runs back across lots 1, 2, 3 and 4; that is the depth of these lots. I mean that these lots west of Main St. on the north side of Canda Street, which were originally platted to face Canda St., front on Main St., and run back the entire length of the four lots.

Back of these lots are lots 5 and 6, facing on Canda St. and continuing through to Pine St.; I placed \$1,200 on lot 5 and \$800 on

lot 6. They are all 40 foot lots, fronting Canda St.

In block 3, I valued lot 1 at \$1,000, lot 2 at \$900, lot 3 at \$900, lot 4 at \$800, and lot 5 at \$800. The lots are 40 by 120 feet, for all the lots fronting on Canda St., as far as Pine St., which is the next street west of Main.

The highest frontage price I fixed in Ishpeming was \$200 a foot, on lot 75 of the original plat on the corner of Front and Main Sts. I fixed lot 81 at \$175, lot 82 at \$125, and lot 76 at \$150 per front

foot.

As to my valuation on lots on the south side of the railroad lands at Negaunee, I did not know exactly where the railroad line was, so I made an average valuation of \$300 per entire lot, treating the lots where the road runs through and the lots adjoining those the same.

I did not try to find where the railroad line actually was or 1122 how much of the lots the railroad used, and where there was a very small corner outside the right of way, as in lot 105, I did not intend to apply the \$300 value there.

On April 25, 1914.

Davis recalled.

Further direct examination.

By Mr. Wykes:

In addition to those which I gave before, I have taken from the field notes of the Tax Commission certain of the average values fixed for assessment from the Alger County line to the east limits of the city of Marquette, through Marquette county, and have set them down in a table.

(Mr. Eldredge objects to the testimony because it has no tendency to show the value of the lands, is not competent, and because it allows no opportunity to show the truth in rebuttal, as it proposes to give averages.)

From the Alger County line to mile post 150, not including any of the additions around Chocolay, the average value per acre was \$2.81. These figures were prepared for the tax roll by the State

Board of Tax Commissioners in 1913.

From mile post 151 to mile post 151.92, the east limits of the city of Marquette, the average value was \$5.32 an acre. I have not included from mile post 150 to mile post 151. That was the plat of Lakewood, which I did not take. I have a copy of the figures from which these averages were computed; that is the assessments and the descriptions by the Tax Commission.

(Witness handed detail figures to Mr. Eldredge for the purpose of cross-examination. Mr. Wykes stated that he has introduced simply the computation of the average, to save putting in each detailed description and each price.)

(Mr. Wykes produced a duly certified copy of the Articles of Consolidation of the companies forming the D. S. S. & A. Ry. Co., which is marked Defts.' Ex. 54; also a duly certified copy of the Articles of Consolidation of the companies forming the M. H. & O. R. R. Co., which is marked Defts.' Ex. 55; also duly certified copies of the following Articles of Consolidation: M. H. & O. R. R. Co., marked Defts.' Ex. 56, Houghton & L'Anse R. R. Co., marked Defts.' Ex. 57, Bay De Noquet & Marquette R. R. Co., marked Defts.' Ex. 58, and M. & O., marked Defts.' Ex. 59. He also produced a duly certified copy of the various contracts and records of the State Board of Control of State Swamp Lands, which is marked Defts.' Ex. 60.)

1124

On March 26, 1914.

FRED M. Twiss, a witness called by defendants.

Direct examination.

By Mr. Wykes:

I live in Lansing; have lived there since 1899. At present, my official title is Chief Examiner of the Board of State Tax Commissioners in Michigan; have been such for three or four years. I was the first secretary of the State Board of Tax Commissioners, under the act of 1899, and held the place until Governor Bliss was inaugurated and a partial change took place in the Board. Since then, my duties have been the personal examination of property in the state liable to taxation under the general tax law and the supervision of men engaged in that work, when not actually engaged in making personal inspections. My entire time has been spent in that work. I have no other employment.

I have valued property in many counties and cities (naming nine cities of the state in which he worked). In these, I personally examined and valued properties for purposes of assessment or state equalization, and have superintended and examined the work of our field men in other districts. At present, I am in charge of the Tax Commission force engaged in ascertaining the value of Wayne County, including Detroit, for state equalization purposes. Since my first connection with the Board, I think the tendency of assessed values has been upward. Within the last year or two, the purpose

has been to put property in the rolls at cash value.

The work in Marquette was as described by Mr. Horton. I was there while the active field work was being carried on—six weeks, altogether. Several years previous to that, I examined property there. I made an examination of South Shore, at Marquette, with special attention to valuing it, three years ago, I would say; it might have been early in 1912. Outside of the cities in which we reassessed property, I have a general knowledge of Upper Penin-

125 sula land along the South Shore, and I think of all rural

lands in the Upper Peninsula.

Referring to Complt.'s Ex. 1b, Riggs, I cannot place value on description 3 from personal inspection. Description 6, I value as \$200 per lot. In description 8, I would value the lots at \$100 per lot; in description 9, \$100 per acre to cemetery and \$25 per acre from there to city limits. In description 11, \$9 per foot on Lake St.; in description 12, lots 41, 42, 43 and 44 at \$250 each; lot 1, east half of lot 31 and lot 32 at \$250 each; and lots 69 to 74 inclusive at \$200 each.

I consider lots 41, 42, 43, 44, 1, east half of 31, and 32, facing on Genesee street, worth \$50 per lot more than those facing on Mesnard

In description 13, I place \$15 per foot for frontage on Lake St.,

and add \$500 for the land in the rear—200 feet from Lake St. and facing Jackson St. In description 15, I value the corner of Baraga and Front Sts. at \$90 per foot on Front St.; in description 16, \$15 per front foot; in description 17, \$30 per front foot, as average value; in description 18, \$20 per front foot, on average; in description 24, \$150 per front foot on east and west side of Front St., north of Main—the part on west side of Front St., south of Main, appears in a later description; \$125 per front foot on east side of Front St. south of Main.

In description 26, on east side of Front St. immediately south of Main St.; I valued at \$125 per front foot. In description 27, I made two computations. Assuming that the street was there, available for use, that the company had full possession of it and could dispose of it in fee, my valuation is \$59,500; assuming that the plat is available for use only from Front St. and Third St., I placed a valuation of \$42,840. If it is to be used from the two ends, without access from Main St. to middle lots, my value is \$42,840. If Main

St. can be put through and used as a street, I have assumed the depth of the lots on Front and Third Sts. as 124 feet, and have divided the part facing Main St. between those measurements into lots and valued them per front foot in reaching my \$59,500 plus valuation. That valuation covers description 28, also; it would involve the use of that as a street, and render it im-

possible to use it for any other purposes.

I valued description 29 at \$5,850; that does not include the cut 127 feet deep by 38 feet on Front St., which I valued at \$150 per foot; I considered that as a lot, and included it in my valuation. I valued description 30 at \$19,400, description 31, at \$7,200, and description 32 at \$18,000. I would not price lots in an unplatted tract without streets as high as individual lots after the tract was platted and was being sold, nor would a purchaser pay as much for lots in such tract as for such individual lots, in my judgment.

In description 33, I would place an average value of \$50 per lot on that 7.15 acres, for platting purposes, lots 50 by 125 feet. From that point west, on the 5.74 acres, the values would diminish, in my judgment. In description 34, I would value the 72 acres at \$100 per acre. I think I understand the location correctly; it is the right

of way through the Harlow property.

I would value description 35 at \$100 per acre; in description 36, through the West End plat at \$100 per acre; on section 15 at \$30 per acre; on section 10 at \$50 per acre; on lots 3 and 5, section 11, at \$100 per acre; on sections 2 and 11 at \$160 per acre. These values are exclusive of any structures on the land, and are based on value of adjacent and nearby property, and also on business conditions in Marquette city, and probabilities of growth in different parts of the town, and the use to which I thought this property might be put. I made independent investigation as to land values in Marquette.

1127 I visited the properties I have testified to, and investigated sources of information, as rentals, etc., with regard to value.

My knowledge of rents came from Mr. Horton and the employees

who had preceded me in making the investigation. I consulted with them, in the way of looking over their notes, and then I went around and visited the railroad and other properties, enough of them in the vicinity so I could judge whether my men were fairly doing their work or not; so I would be competent to judge of land values.

Twiss.

Cross-examination.

By Mr. Eldredge:

The prices I fixed on lands valued are not the same as those placed by Mr. Horton yesterday; they differ on the frontage on Lake St. and Front St., on the value of the passenger depot grounds, and of the land between Fourth and Fifth Sts. I don't recall other places now.

My value on item 24 is \$150 per foot on each side of Front St. north of Main; that is not the same value I placed in my assessment on north property, but it is on south property, to Main St., I think.

on north property, but it is on south property, to Main St., I think. In arriving at \$59,500 value for depot property on Front St., I placed \$150 per front foot. In valuing the parcel at \$42,840, I valued entirely from values on Front and Third Sts. I valued the Front St. frontage in that computation at \$210 per foot, 153 feet, and extending back half way across the block, 287 feet deep; on remainder of the block, which I valued as fronting on Third St., 153 by 287 feet, I placed a value of \$70 per front foot, which made a total of \$42,840.

In arriving at my \$59,500 valuation, I assumed that the company had fee simple rights in Jackson cut, and took 183 feet front1128 age on Front St. extending back 127 feet, at \$150 per front foot, 183 feet Third St. frontage at \$40 per foot, and 326 feet fronting on Main, with depth of 183 feet, at \$62.50 per front foot, making a total of \$59,465, and I called it \$59,500. The only difference between Mr. Horton and myself on that valuation was that I put \$62.50 and he put \$45 on the Main St. frontage under

this second method of computing the value.

Under this second method the 183 feet frontage on Front St. would include the Jackson cut. I assumed that Main St. frontage was to be utilized for business purposes. I would face buildings on Front St. so that it came to the north side of the cut; I assumed that 30 foot street was a part of the property—the 30 feet north of the cut. Main St. is not used by the public as much as Front St.; it is 36 feet wide, outside of the Jackson cut. My computation included the facing of the Main St. lots on that 36 foot street; that was the most valuable use of the property I could think of.

I valued the land on the southeast corner of Front and Washington Sts. at \$200 per front foot on Front St. for 50 feet; from there farther south, I think to Main St., at \$150 per foot. South of Main, it ran from \$125 down to \$100 a front foot at Baraga Ave.,

as I remember.

I valued the southwest corner of Front and Washington at \$200

per front foot on Front St., for 50 feet. I valued the Jopling lot, about 50 feet front on north side of Washington St., at \$8,000, when I knew it had just been sold for \$9,000, at about \$160 a foot. I put the northwest corner of Front and Washington at \$200 per front foot, for 50 feet I would say. I don't remember what I put the next lot at; the record and field notes don't show; they don't show the land and buildings separately. The ownership of this particular corner is all in one individual, or one ownership,

and the value of that block was put in as a whole. Mr. Horton and I agreed, after gaining what information we could from people we thought competent, that these corners should be valued at \$200 per front foot. I think I carried that valuation 50 feet each way, but am unable to tell how it was graded down from I think lots 5 and 6 belong to the Harlow estate, one ownership, as I remember. I can tell the total assessment of land and

building on any lot.

In my judgment the property on Washington St., west of Front St., for about one-half or two-thirds of the first block after you get away from the corner lots, that is, to the west side of lot 8 inclusive on the north side of the street, and to the east side of lot 2 inclusive on the south side of the street, is more valuable than property on Front St. I think there should be a break in value for lot 7 on the north side. I know the property purchased by the Elks; it is lot 2, except east 25 feet, and east three feet of lot 3, 41½ feet.

Mr. Wykes: We treated it as 381/2 feet when Mr. Horton was on the stand.

I think the assessment amounted to \$125 per foot. I was the party who made recommendations to the Commissioners in cases of doubt; I did not assess the property, but had charge of work there. The Commissioners were in Marquette and viewed many properties there before the conclusion of the review. They prepared their valuation rolls as presented in these field books, what we recom-mended, but made some examination there before the tentative figures were decided upon.

I made such examination of residence property as in my judgment qualified me to pass value on it. I do not claim to have seen all of the property in the city, but paid particular attention to parts

I visited, with Mr. Horton, every plat in the city, but not 1130 every house. I could not recall block 12 of John Burt's Add. without looking at my notes; between Third and Front Sts., the south side of Washington St. is the more valuable. On the left hand column of the left hand page of the field books are the figures for real

estate put on the rolls by the Commissioners.

The Tax Commission's assessed valuation of lot 3 of block 12 is \$4,800; I only have my notes; there is no other record of that roll. We have no roll; our work is carried out on these field books, which are copied from the assessment rolls; then, when the review is held, the figures that the Commission depends upon for valuations are placed in a column provided for that purpose in the local assessment There is no other roll except the local assessment roll.

As to the \$3,500 assessment by the Commission on lot 9 of block 2 of John Burt's Add., the figures on the field book, checked off with a blue pencil, would indicate that that was the figure placed on the That is the only way I have of knowing that that is so. I did not attend the hearing at Marquette. Those notes made by one of the examiners indicate the owner paid \$1,275 for the lot and \$3,000 for the house, and that it would be a low valuation at \$4,000, one of the verified sales. The Commission placed a value of \$3,500

The east 75 feet of lot 6 of block 4 of John Burt's Add, was assessed at \$6,000 by the Commission; the notes given to the Commission show it was a two-story brick building, occupied by the owner, and that he says he would not sell for less than \$10,000; worth about \$8,000; he has been offered \$10,000; also a question mark in next column after the \$6,000, and the word "woman" to the right of it, indicating to me that she was a lady whom the Commission did not think able to pay taxes on full amount of property, and gave it

some consideration. I think the statute on exemptions can be 1131 construed to give any assessing officer the power to exempt any portion of the value of a piece of property that they choose. It is sometimes done. The Commission follows, largely, the action of the local assessing officers, who are familiar with the facts, and we very seldom disturb their action with regard to exemption, so long as we (Sec. 3830.

maintain the relative proportion between properties. (Sec. 3830, subdivision 7, Compiled Laws of 1897, set out in part.)

I think I remember lots 1 and 2 of block 5 of John Burt's Add., known as the Hargrave Flats. This property was assessed at \$40,000 by State Board of Assessors, and the notes submitted by the men who originally looked over the property show it was a two story stucco flat consisting of 13 apartments of five rooms and both each, and that it

was worth \$42,000.

Lot 9 of block 5 was assessed at \$3,900 by Tax Commission; I assume those figures are correct. In the judgment of the men who took the field notes reported to the Commission, the property was worth \$4,500; it was not the judgment of Mr. Horton and myself. I cannot tell who took the notes. I remember Mr. Horton and I visited those, and where there were any changes made, unless something there indicates that the Commission changed them, they were the figures we recommended after examining the property. I won't say that either or both of us were always there. Sometimes the notes show changes made on review; sometimes they don't. Sometimes the original figures recommended by examiners are erased and Board figures written over them. I do not know who the examiner was here.

Lot 14 of block 5 of John Burt's Add. appears to be assessed at \$3,000 by the State Board; the examiner reported it worth \$3,500. I cannot recollect that particular property, and no one would

1132 know whether I visited it or not. The notes on that class of property were made by one of the examiners and afterwards examined by the man in charge of the work, either Mr. Horton or myself, or both of us, and all changes outside of those made at Board of Review, from testimony there, were made either by both of us or Mr. Horton himself. There would be no way of telling definitely how any change came to be made, unless it might be property of which he had specific recollection. We look at so many pieces of residences that it is difficult to carry them in mind, unless some particular thing causes us to remember. We remember business property better than residence property after a space of time, because it constitutes a much smaller percentage of property in any community. I would say this particular reduction was made on the recommendation either of Mr. Horton or myself, so far as I can see the record in

the field book.

I cannot tell who made notes on lot 13 of block 6 of John Burt's Add.; it was assessed at \$2,500 by the Board, as shown by that book, and the examiner reported it worth \$3,000. Some change has been made in that item since it was originally put in there, in the column from which the assessments were put on the roll; I don't know whether that was made by the examiner or by the Board of Review. The records showing the assessment roll will indicate the figures placed by the Board; they do not indicate the figures recommended by the examiners. The figures shown in the column immediately following the description in these notes indicate dollars. As to the two figures opposite each description, I am confused as to their order; Mr. Horton can tell about that, better than I.

In my judgment, residence property in John Burt's Add., has increased some in value in recent years. I think I covered a period of about 10 years in talking with different real estate men there. I

think the values I placed in Marquette were true cash values, 1133 conservatively so, that is, those that went on the assessment roll. If there was doubt as to value, I gave it to the owner of the property. In each case where my judgment was called upon, I arrived at a conservative cash value; not a price that might be received for property by waiting eight or ten years, or one at which a man could sell at once.

I endeavored to put all property at its conservative true cash value,

and I think I did.

Twiss.

Redirect examination.

By Mr. Wykes:

John Burt's Add., appears on Defts.' Ex. 6a, and is four blocks from station. I don't know how many descriptions there are in Marquette; it would run into the thousands, I think. I was not present

at the time of the review.

In fixing my assessments upon the real property in Marquette, and in the work looking to final values placed by Tax Commission, I used my best judgment. If there was any doubt as to value in the cases I have stated, I placed the valuation favorable to the railroad company in such cases; that is, if there was a doubt as to whether it should be high or low, I believe I placed the high amount. I resolved the doubt the other way, where I assessed for taxation purposes.

1134

On March 28, 1914.

A. B. HUBBARD, a witness called by defendant.

Direct examination.

By Mr. Wykes:

I am one of the field men of the Tax Commission; I have been employed in that capacity four or five years. During that time, I have been in the office, now and then, for a short time, but on the field practically all the while. The field work has not been confined to placing valuations; I have gathered data for the State Tax Commission, for purposes of valuation, equalization, etc.

I have worked in placing values in Gogebic, Dickinson, Iron and Marquette counties in the Upper Peninsula, and in Van Buren, Clare and Charlevoix counties in the Lower Peninsula; perhaps in some

others I do not now recall.

In Marquette County, I worked in Marquette, Ishpeming and Negaunee; I placed values on the Excelsior Iron Mining Company's plat, Nebraska Hill location, and several others, in Ishpeming, and on the Jackson Iron Mining Company's plat, the principal one near the railroads, in Negaunee.

In order to acquaint myself with values, I interviewed real estate men, bankers, etc., and gathered all the knowledge I could, investi-

gated the sales, offers and bids, where I could find them.

The Jackson Iron Mining Company's plat in Negaunee adjoins the South Shore; it lies on both sides of the south line, I think.

It was my purpose, and I carried it out as fully as possible, to place the actual cash value on property for which I fixed values.

1135 HUBBARD.

Cross-examination.

By Mr. Eldredge:

I did not conceal the purpose of my visit to Negaunee or Ishpeming. I don't know that they knew what I was there for, but I never misrepresented my purpose when asked about it. The people I interviewed knew what my purpose was—the bankers and real estate men.

I think there were quite a number of transfers in the Jackson Iron Company's Add.; that is, within the last two years. They were placed on the field book, and I used them after they were placed there. I presume I was at Negaunee about six weeks, solidly. I was called away, at intervals, to different places, at Marquette and Ishpeming.

HUBBARD.

Redirect examination.

By Mr. Wykes:

I was not attempting to fix the value of any mineral, or anything of that kind—just surface values. In talking with people about the amount to be put on their own property, in using the figures they gave me, I always took into consideration the tendency to under-state values given to a man assessing property. I never, as a rule, fixed the value of a man's property at the price he said I should, but I took it into consideration, always using my own judgment.

1136

On April 14, 1914.

CHARLES M. WHITESIDE, a witness called by defendants.

Direct examination.

By Mr. Wykes:

I am sixty years old, and have lived at St. Ignace ten years. Before that, I lived two years near Brevort Lake, which is 15 miles from St. Ignace and 3½ miles west of Allenville. My business in Mackinaw County has been surveying, land looking, and dealing in lands and timber. I was County Surveyor for two years, after 1904.

I have bought and sold lands in the western part of the county, northwest of St. Ignace, and am familiar with land values in St. Ignace and along the railroad outside. I know the lands of the South

Shore at St. Ignace.

At St. Ignace.

At St. Ignace the 1.36 acres which lies between High and Spring Sts., and is a part of description 3, would be worth \$50 or \$60, if the track was taken up and it was in shape to be utilized. My value is

based on sales in the vicinity.

The triangular parcel of .63 of an acre in description 3 could hardly be sold at all in that shape. If it was square or rectangular, it might bring \$8 or \$10 a front foot on Spring St. There would be about three lots in that parcel.

Acreage property in St. Ignace is pretty cheap. Considerable has changed hands inside the city limits for from \$1.50 to \$6 or \$7 an

acre. The city limits extend out quite a long way.

The triangle on State St. at the south and east end of description 7, is too small to be good for much—big enough for a popcorn stand or something of that kind. If it had one hundred foot depth, it probably would be worth \$20 or \$25 a front foot, but it is worth considerably less than that in its present shape.

The remainder of description 7, which is 3,170 feet of right of way about thirty feet wide, and colored green on Complt.'s Ex. 4a, is worth about \$1 a lineal foot, for the bare land. There have been sales along description 7, some for more and some for less than the price I have named, as some of the land was improved. The un-

improved land there sold lately for rather less than my price. A lot

on Goodrow Alley sold recently, but I don't know the price.

I base my judgment of the value of this land upon a general knowledge of the sales that have taken place there since I have been in the town. Not very much property has changed hands there, and every-

body usually knows all about a sale.

The .72 of an acre on State St., which is directly opposite the coal and lumber dock, and crossed by the dock track, would be worth more than it is if it wasn't cut across by the track. In its present shape, \$20 a front foot on State St. would be a big price for the whole tract. A three-story hotel on about 130 feet front adjoining, including going business, good will, and all, sold for \$6,500.

The next property adjoining that, with about the same frontage, but not so deep, with a two-story hotel on it, and as a going business, sold for about \$4,000, not long ago. If you deduct for the buildings

and the good will, there would not be much left for the land.

You might be able to get \$40 or \$50 a foot for a lot off the corner next to that .72 of an acre, but the balance would be practically unsalable at any price, as it is a little three-cornered place, not big enough for anything. It has only a little front, and no other way of getting to it. I see it every time I am down town. The right of way across it is fenced in, about 18 feet wide, and it is also

way across it is fenced in, about 18 feet wide, and it is also fenced off from the street. There are no structures on the balance of it, and it is used only for ornamental purposes.

Parcel 8, which is 49.81 acres, and takes in the gravel pit and part of the yard, and runs out to mile post 2, would not bring \$10 an acre for any other purpose than railroad use, in its present condition, although the gravel pit has been worth considerable to the railroad. Land very near it, if not adjoining, was recently acquired by the State for taxes, and sold at public sale. That is inside the city limits of St. Ignace, and brought considerable less than \$10 an acre at the sale.

The lands on the other side, to the east, are improved quite a bit, and have residences. The unimproved land there has been platted at some time, and lots have been sold for from \$10 to \$150. They have brought less, of late years, than they did 25 or 30 years ago. I had general information of such sales. People who own land there want

high prices. They are "land misers" and want to hold it.

I am more or less familiar with the water front property at St. Ignace. For two years, I have had some for sale on claim 6, between State St. and the lake. There is about 200 feet on the lake, and about the same on State St. It lies a short distance north of Bertrand St. The entire piece has been for sale for \$600. It is about 200 feet square.

We have considerable water front at St. Ignace. The price depends on how badly you want the particular location—what you are going to use it for—but quite a bit of our water front has been sold

for taxes in the last few years.

Some water front between State St. and the lake, and about 80 rods north of South Shore water front, was offered for sale for taxes, but was not redeemed. I don't remember the amount of taxes.

I should say that \$5 a front foot would be a liberal price 1139 for South Shore water front, unless it was wanted for some specific purpose and no other location would answer it. There are three miles, or better, of water front in St. Ignace,

On description 7, which I valued at \$1 per lineal foot for 3,170 feet, I based my judgment upon its location and the property adjoining, some of which can be bought for less, and some of which

is worth more, where there is room to do something with it.

St. Ignace property moves slowly-not more than six sales there the last year. For the last ten years, sales have not been very frequent.

WHITESIDE.

Cross-examination.

By Mr. Eldredge:

I said that my knowldege of sales in St. Ignace was hearsay. The lot that the purser bought was the second from the corner, facing Spring, near Chambers St.

If the railroad were taken off of this .72 of an acre, it would be worth about \$20 a front foot. Goodrow Alley is one of the principal

thoroughfares of the city. The lot which I said was recently sold was 50 by 100, and is the second from the railroad track, towards the Straits, on Complt.'s Ex. 4a, Riggs. That sale was over a year ago. One of the hotel properties—the Dunham House—sold last fall; the other within

WHITESIDE. 1140

two years.

Redirect examination.

By Mr. Wykes:

I have sold 2,000 or 3,000 acres altogether. Besides buying and selling, I do surveying, land looking and timber estimating, principally in Mackinaw County.

On April 14, 1914. 1141

Joseph L. McCheskey, a witness called by defendants.

Direct examination.

By Mr. Wykes:

I have lived at St. Ignace seven years. I am superintendent of the yards of the Warner-Newton Lumber Co., and am City Assessor, appointed about two months ago. I have investigated the value of city property for the purpose of fixing my assessments. I have attempted to arrive at the cash value, and have covered the part of the city in which South Shore right of way is located. I am familiar with the value of the land between Catherine and Graham Sts.

The owner of the Dunham House property held it for three years at \$5,000, and tried to sell it. It had a two-story hotel, and about 130 feet frontage on State St. The lot on Goodrow Alley, mentioned by Mr. Whiteside, was sold by the Fairs for \$500. It was on the north side of Goodrow Alley, and had a house, which could not be

built for what it was sold for.

The frontage on State St. adjacent to the location of the green triangle, at the end of parcel 7, would be worth about \$200 for a lot 50 to 66 feet wide, if the lot were vacant. I intended to leave the assessed value of this property at the same figures at which it now stands, as I don't think we can raise it, the way things are moving in real estate.

Any lot anywhere in the city along State St. would be worth \$200, outside of the two hotels, which have good big buildings. I am assessing them at that figure, where unimproved, and I am as-

sessing at actual value.

The .72 of an acre on State St., opposite the coal and lumber dock, would not be worth over \$5 to \$7 a front foot, if you were liberal,

considering the value of property in St. Ignace.

Unimproved lots near the Humphrey or South Shore lots sell for \$50 to \$125. I was offered any lot there for those prices last spring by McNamara, who holds that property. I think they are 50 to 66 feet front. I have bought only a house and lot in the residence part of the city, and have sold none.

1143

On April 14, 1914.

WILLIAM M. SNELL, a witness called by defendants.

Direct examination.

By Mr. Wykes:

I have lived in Sault Ste. Marie for 26 years; have been County Clerk four years, and Probate Judge 12 years. Since Jan. 1, 1913, I have been practicing law, and handling real estate and loans. Since 1895, I have dealt more or less in real estate, and now own property in Sault Ste. Marie. I own a half interest in the Gilmore G. Scranton Add., in the suburbs, and have an equity in the McGregor Add., which I purchased under contract. The latter is in the southeastern part of the city. I own various other lots, some purchased recently.

In the last year or two, I sold 28 lots in blocks 2 and 3 of Scranton and Robertson's Add. for \$150 a lot, or \$4,000 net. That was a low sale. I hold for sale that part of private land claim 4, south of Ridge and Spruce Sts., about 2½ acres, for \$6,000. That is 208.6 feet on Spruce, 232 feet on Ridge, and 520 feet from street to street. It has been on the market for that price for two or three

years, but I haven't been able to sell it.

I am agent for the Foss and Hyde property, which is right south of the Northwestern Leather Co.'s plant and near the Scranton Add. It is platted into lots, three of which I sold four or five years ago for

That was the high water price, and we have been forced to revise our prices since then, as there is no demand. sold about eight lots there in five years; the others were sold from \$75 to \$125 each. There are still about 100 lots unsold. Scranton Add. has been on the market since 1901 or 1902. about two years, we did quite a brisk business, selling a couple of lots a month, for \$175 to \$250 each, on the installment plan. Then the demand dropped away, and the sales have been very few and far between. I got \$250 for the last lot that I sold, as it was a nice The inside lots have sold from \$175 to \$200,

corner lot. I discounted some of the contracts, to get them 1144 to carry them out. I sold lots 3 and 5 of block 2 of Scran-They were 40 by 125 feet. I have sold ton's Add. for \$75 each. no lots in the South Shore or Foss and Hyde's First Additions.

There seems to be no demand.

Algonquin, south to city limits. For a short distance immediately southwest of the curve, right at Algonquin, there is some fairly good territory which might be worth \$150 an acre, possibly more. The Algonquin Add. is in there, and has some very nice lots and houses, while on the west side of the track there is Beadle's Add. Not considering that locality, I should say the strip from Algonquin to city limits would have an average value of \$50 an acre. further out, the lower the value, possibly \$15 or \$20 at the city limits. I would put \$150 on the land from Algonquin to the west side of Hall's Add on the N. E. of the S. W. of 11.

The S. W. of the N. E. of 11 would be worth more, say \$600 an acre, counting the lots at \$100 each. At that price, there would be no immediate sale, but you would have to hold them for a num-

ber of years.

Description 8 on Complt.'s Ex. 3a, which contains 9.57 acres, is That is a liberal price, and just exactly what worth \$500 an acre. I paid for this land now platted into Scranton's Add.

was even more favorable then than at the present time.

Description 7, 17.45 acres, and being divided into four parcels, is worth \$350 to \$400 an acre. That part of description 6 on Complt.'s Ex. 3a is the S. E. of the S. W. of 1; it is worth \$250 per acre; that That part of description 6 on Complt.'s part east of the east line of that description, and west of 6th St., is worth \$300 to \$350 per acre. Descriptions 5 and 10 on

Complt.'s Ex. 3a, and not including any water or riparian rights, is worth \$500 to \$600 an acre for sub-division. These

values are based on sale of adjacent land.

Description 11, immediately south and adjacent to description 6, is worth about the same as 6. Descriptions 12 and 13 I would value a little lower than 6 and 7, because the latter are nearer water front.

The Union Station property immediately north of Private Land Claim 4 is a little more valuable than Private Land Claim 4, as it is the frontage facing the canal. When the station was located at its present location, land values in the Soo were greater than at present. Locating the station there stimulated values adjacent for a while. Although we have had a great slump in real estate values throughout the city, the value close to the station is greater today than when they made the change. Property along Magazine St. has been greatly enhanced in value-some is worth two or three times as

much.

Three or four lots in Emaline Wood's Add. sold for \$500, for the bunch. I was offered two lots in Scranton & Robertson's Add., block 3, on Spruce St., for \$125 apiece, but refused, because I was loaded. I think they were cheap at that. If you can buy the S. E. of the N. E. of 13 for \$10 an acre, it is a good buy.

The corner opposite the new station was enhanced in value by locating the station there, possibly three times, and all property on Portage Ave., between Magazine and Ashum, was thus enhanced, as were lots in Emaline Wood's and Scranton & Robertson's Additions.

1146 SNELL

Cross-examination.

By Mr. Eldredge:

I would value the land from Algonquin southwesterly to Hall's Add., which is N. E. of S. W. of section 11-47-1 west, at \$150 to Only certain portions of S. W. of N. E. are worth \$600 an \$200. Taking it as a whole, I wouldn't think that Hall's Add. was acre. worth more than \$100 an acre; possibly those blocks immediately adjacent to the road might be \$150 an acre. From that point to the corner of section 15, the value is \$50 an acre. From that point to the city limits, the average would be \$15 an acre.

I sold the 28 lots in Scranton and Robertson's Add. for \$4,200, and waived my commission, making them \$4,000 net. I am now agent for the purchaser, and they are held at higher prices-\$10 a front foot on any street on which they front. They run from 25

to 40 feet in width.

The railroad property southwest of the canal as far as Sixth St., I valued at \$500 to \$600 per acre. From Sixth St. west to the north and south quarter line of the section, I valued it at \$350 per acre. The land in there adjacent to the water front is worth about 25% more than that farther away, but my average is \$350 an acre.

From this quarter line to the next quarter line, my value was \$250, and from there to Algonquin I again divided it, putting \$350 on it to the next quarter line, and from the section line to Algonquin

\$500 an acre.

1147

On April 15, 1914.

CHAS. E. CHIPLEY, a witness called by defendants.

Direct examination.

By Mr. Wykes:

I am thirty years old, and have lived 20 years in Sault Ste. Marie; all the time in real estate business, being now connected with Moffly

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& Chipley. We conduct a business on both sides of the Soo. I have been in the general real estate business, making deals all over the city, and have purchased land for myself, and as agent.

We now have lands listed for sale by ourselves and others, and I am familiar with land values in the American Soo, and the right of way of South Shore from the tannery down, and know its value. The tannery is at Algonquin, on the lower part of section 11.

Within the last few years (April, 1913), I sold the parcel of land marked American Brick Co. on Complt's Ex. 3a, Riggs. It is a part of Private Claim 1, and contains 13.21 acres, all upland, and between 1,000 and 1,400 feet of shore front. It lies immediately across the highway, north from the railroad lands. The consideration was \$10,000 for upland, water rights and all.

We have number 225 Magazine St., which is just south of Emaline St. extended east, for sale at \$1,500. The lot is 35 by 225, and there is a store building on it easily worth \$1,000. In June, 1912, I sold

a lot 35 by 150, with buildings worth \$1,000, for \$1,250.

Lot 4, block 4, Emaline Wood's Add., 50 by 110, with two buildings, worth \$500, sold in May, 1912, for \$800. Lot 8, block 3, Scranton and Robertson's Add. 35.7 by 105 feet, a vacant lot, sold in April, 1913, for \$357. The north half-of lot 9 and all of lots 10, 11, 12, 13, 14, 15 and 16, block 2, sold in March, 1912, for \$1,500. They were 35.7 by 105 feet. We tried, the other day, to sell lots

148 17 and 18 of block 3 of Scranton & Robertson's Add. for \$125

apiece; they are 25.7 by 105.

From Fourth Ave. extended, to center line of section 12, the land is worth \$200 an acre. From center line of section 12, to south bank of water power canal, is worth about \$400 an acre. I took the South Shore Add. as a basis. From north bank of water power canal, to west line of Grand Trempes Ave., is worth \$1,500 an acre. From west line of Grand Trempes Ave. to east line of Magazine St., is worth \$3,500 an acre.

We have the Iroquois Hotel site, with 143 feet on Portage Ave. and 416 feet depth, besides another parcel, 45 by 103 feet, making a total of about 64,000 feet, or an acre and a half. That is for sale

for \$8,000, and has been for two years, on easy terms.

We also have listed Private Land Claim 73, which is north of

Portage Ave., just west of Ashmun St.

I am generally familiar with the South Shore lands as indicated on Complt.'s Ex. 3a, Riggs, and the values I have stated would apply to the full width.

CHIPLEY.

Cross-examination.

By Mr. Eldredge:

The 13 acre tract on the river, sold by Perry, was on the market three years at the sale price. Lot 4, block 4, of E. Wood's Add., which sold for \$800, was bringing \$15 a month income when sold,

in May, 1912; \$800 was cheap for it. We can't sell unless we think property is worth more than we sell it for. In my judgment, its present value is \$1,000 to \$1,200.

The 7½ lots which I mentioned sold for \$1,500 net in March, 1912. The buyer, Mr. Olds, got about \$1,700 for

them, from the Pintsch Compressing Co.

From the line between sections 12 and 1 to the south line of the canal, I valued the land at \$400 an acre, but wouldn't buy it at that

and plat it.

1149

From the tannery to the line between sections 12 and 1, I valued the South Shore land at \$200 an acre. In arriving at these figures, I did not take into consideration the fact that a large tract of land would be thrown on the market, thereby decreasing values, but put a price on it that I thought would be fair under present conditions. My prices represent the speculating value on the present market if the town is improved. This applies only to the \$200 and \$400 valuations. From that point up to the station, the value of the land is more or less fixed by the Scranton & Robertson Add, prices.

CHIPLEY.

Redirect examination.

By Wr. Wykes:

The water front first spoken of as sold for \$10,000 was part of a bankrupt estate. I do not know whether it was appraised at that by Stradley, Snell and Davidson, or not. The Soo Savings Bank was interested, and everybody was satisfied at that figure.

The kind of property represented by lot 4, block 4, which sold for

\$800, would have to bring 20% gross in order to net 7%.

I got the idea that the sales in block 3 of E. Wood's Add. to Mr. Stradley were for the railroad. The property adjoins the railroad land, and that was my personal idea.

1150

On April 15, 1914.

CHARLES RIPLEY, a witness called by defendants.

Direct examination.

By Mr. Wykes:

I have lived in Sault Ste. Marie four years. I am on my second term as City Assessor, and am making my third assessment. I have been Supervisor of Sault Ste. Marie township, and have assisted other assessors in making their assessments. I have owned, bought and sold land in the Soo; at one time, I owned Private Land Claim 94, of 19 acres, just the other side of the round house, which I sold to the railroad company in 1887 for \$3,500. L. P. Trempes owned the next land claim, west, at that time. It consisted of 53 acres, originally,

but the shore washed off some of it. That was Land Claim 1, and I understood he sold it to the railroad for \$10,000.

Mr. Gager owned 20 acres immediately east of that; the roundhouse now stands there. The railroad paid \$3,000 for it, Mr. Trempes said.

All three claims took such water front as was adjacent.

Compared with today, the land values in the Soo were high in 1887; that was the year of the boom. I paid \$500 for that 19 acres in 1883; it wouldn't be worth \$3,500 nor anywhere near that, for any other purpose than the railroad. I think that the sale at \$3,500 was at double its true value.

(Objection, by Mr. Eldredge, to testimony as to assessed valuation of property, as having no tendency to show its value.) (Witness produced assessment roll, and testified as follows:)

1151

Sec-			Assessed	
tion.	Description.	Acres.	value.	Remarks.
15	W. 1/2	309.53	\$4,000	Except right of way.
10	N. 1/2 N. E. 1/4	71.88	1,000	Except 8.12 acres right of way.
	S. W. ¼ of N. E. ¼	33.45	400	Except 6.55 acres right of way.
	S. E. 14 N. E. 14	40.	400	Except right of way.
10	E. 1/2 of N. E. 1/4 of S. E. 1/4.	20.	800	Exempt. Owned by Chip- pewa Co.
	W. 1/4 N. E. 1/4 S. E.	19.1	350	Except 9 acres right of way.
	W.14 S. E. 14	80.	2,000	
	S. E. 14 S. E. 14	37.7	1,400	Except right of way.
11	S. E. 14 S. W. 14	40.	1,600	
••	S. W. 14 S. W. 14	33.9	1,400	Except right of way.
	N. W. ¼ S. W. ¼	37.19	1,700	Exempt. Owned by Chip pewa Co.
	N. E. 14 S. W. 14	Lots in	10 ea	
		Hall's Add		
	Lot 3 N. E. ¼ N. W. ¼.	19.65	6,000	Has water front.
	S. E. ¼ N. W. ¼ N. of R.	35.15	4,000	Has buildings.
	8. W. ¼ N. W. ¼	Lots in Beadel's A		. Ten lots to acre.
	S. W. ¼ N. E. ¼ N. of R.	4.5	600	
	S. W. ¼ N. E. ¼	21.	3,000	Except R. R. & part of Algonquin.
12	N. W. 14 N. W. 14	12.40	2,000	Exempt. Owned by Soo Line.
	W. 14 N. E. 14	80.	6,000	
	N. E. ¼ N. W. ¼	21.5	1,600	Except right of way & Chandler's Add.
	N. E. ¼ N. W. ¼	.27	50	Except right of way & Chandler's Add.

1152 Scranton & Robertson Addition.

Block	k. Lots.	Assessed value.	Remarks.
1	19 and 20 29 and 30	\$200 both 500 "	Small exception Standard Oil structure.
2	1 and 2	400 " 800 all 300 "	
	inclusive	1,800 " 200 1,200 all 800 "	Pintsch structure.
3	1 to 7 8	700 " 300 800 all 200 both	
	19 and 20	300 all 100 600	Structure.
	36	400 200	House. Vacant.

In making these assessments, I have tried not to get anything less than 75% of cash value. I think a good many of them will run up to the full cash value—what they are worth today. I know of several that have sold for less than I have assessed them; lot 3 in section 11 sold for just what it is assessed for.

RIPLEY.

Cross-examination.

By Mr. Eldredge:

Since 1896, I have owned only the lot where I live; I have no other business than City Assessor. I previously sailed on the lakes, ran a

ferry boat, and was in the mercantile business.

The west half of lot 9, and lots 10 to 16 inclusive, block 2 of Scranton & Robertson's Add., where the Pintsch plant is, are assessed at \$1,800. Before the buildings were put there, they were assessed at \$1,500. The buildings and permanent fixtures are included in the assessment. They only had one, rather small, brick building at the time I made my assessment, and I put lots, buildings and all at \$1,800. In my judgment, the building could be constructed for about \$1,000. I treated the tanks as permanent fixtures, and assessed them as part of real estate. I didn't know what they were worth, and didn't ask anybody.

I assessed lot 4, block 4, of E. Wood's Add., at \$1,000, and lots 17 and 18, block 3, Scranton & Robertson's Add., at \$1,000. The Board of Review cut the latter assessment to \$500 for the two lots. They had a dilapidated building, and were formerly assessed at \$2,000, which I cut in two. The building had not been burned when the

Board cut the assessment to \$500.

In the South Shore Add., lot 4, block 1, is assessed at \$250; lots 9

and 10, block 2, at \$150 for both.

In Chandler's Third Add., lot 7, block 1, is assessed at \$800. Lot 4, block 2, is assessed at \$400; lot 2, block 2, same addition, at \$50; I think there is a building on lot 4. I think there is a house on lot 7, block 1, from the assessment. The vacant lots in Chandler's Add. are assessed at about \$50 a lot.

The vacant lots in the South Shore Add, are assessed at \$75 each; some lots are higher, but there may be houses on them. Lots 1 to 18 are carried at \$400 in Scranton & Robertson's Add., but they are exempt, and the values are not carried out. Lots 3, 4, 5, 6 and 7.

block 2, are vacant, and assessed at \$800.

Lots 1 to 7 are vacant, and assessed at \$100 each. Lots 18 to 24, block 2, are assessed at \$1,200, including a building on one of them. Lots 26 to 32 are vacant, and assessed at \$150 a lot. Lots 9 to 16, block 3, have \$100 a lot; lots 19 and 20, block 3, same price, and all are vacant. Lots 25, 26, 27 and 34 are vacant, and assessed at \$100 each.

In Foss & Hyde's Add., the vacant lots in blocks 1, 2, 3 and 4, are assessed at \$50 each. In Foss & Hyde's Second Add., lots in block 1 are assessed at about \$50 a lot. In blocks 2, 3, 4 and 5, vacant lots are assessed at \$30 each. In blocks 6, 7, 8 and 14, vacant lots are

essessed at \$20 each.

In G. G. Scranton's Add., vacant lots in block 1 are assessed at \$40

block 2, \$50, and block 3, \$40.

In the Algonquin Add., vacant lots in block 1 vary from \$50 to \$100, nearly all being \$50; in block 2, the vacant lots are assessed at \$50 each; in block 3, four lots are assessed at \$100, for all four.

RIPLEY.

Redirect examination.

By Mr. Wykes:

In the several additions, many of the same lots are assessed to the same person. I have sailed as a master, and owned part of the ferry line between the American Soo and the Canadian Soo. I have dealt more or less in real estate, while in business.

1155

On April 17, 1914.

RALPH J. MACKENZIE, a witness called by defendants.

Direct examination.

By Mr. Wykes:

I am 32 years old, and live 1½ miles southeast of Eagle Mills, in Negaunee Township, of which this is my second term as Supervisor. I have made one assessment. My business is farming. I have had 15 years' experience as a mining engineer, for the U. S. Government in the Philippines, and for myself in contracting in South Africa,

where I also did consulting and geological work. I have a diploma from Washington, given to me by a special board of examiners. I was born and raised in Negaunee, and have lived in Negaunee Town-

ship two years.

I investigated land values for the purpose of my assessment, going over the different lands to find out the value of the timber and the quality of the soil for farming. I think I am a competent judge of the value of lands in Negaunce Township, and am familiar with the land along South Shore there. I can give a description of almost every foot of it. It is mostly sandy and rock bluffs, those Diorite bluffs, which are of an ignious formation that is of no value for There is no soil to speak of, at all. anything.

On sections 24, 25 and 26, the land along South Shore is worth \$4 an acre. I placed my valuation here according to what I thought it was worth and what I could buy it for. That is about the best price I could get for it. In section 24, there is only rock and high bluffs along the right of way. To the north, there is a farm, and To the south, there is practically all sand, with undersandy land.

brush and second growth.

In section 34, the land is practically all poor farming land, with sand hills; a good deal of marshy swamp adjoins the railroad, there; more on the north side. The land through that sec-1156 tion is worth \$3.25 an acre. As you go south from the railroad, the land is better. I am following the north line, and going

The next section over the line in the city is 33.

I know the south line of South Shore into Marquette, and can value the land along it. From Eagle Mills down to Morgan Heights Sanitarium, which is about a mile, the land is worth about \$4 an acre.

Going further east from Morgan Heights, there are only two or three sections within Negaunee Township. The land in that stretch is probably worth \$4 or \$5 an acre. It is a little better for farming purposes as you get away from the right of way, and there is a little second growth timber on it.

The values I have given represent the entire value. There are no mines in the township, and nothing of any value, at all, in the line of mining. All the lands I have valued are east of the ore forma-

tion.

MACKENZIE.

Cross-examination.

By Mr. Eldredge:

It is a little over a mile from Eagle Mills to the west line of Negaunee Township, which is the east line of the city of Negaunee, and the value of the land running through there on the south side of the track is about \$4 to \$5 an acre; on the north side of the track along the right of way, and that swamp, the land is worth not over \$3 or \$3.50 an acre, under present conditions.

Within a quarter of a mile on either side of the station at Eagle Mills, the land on the north side of the track is worth about \$6 an

acre, being pretty well cleared. On the south side of the track, it is worth \$3 to \$3.50 an acre. F. W. Read has a 1157 farm, which comes right up to the right of way in that quarter of a mile, which I value at \$6 an acre. I value all of this land for its use for farming purposes. I didn't say that the iron ore forma-tion did not extend into the township of Negaunee. According to my experience and knowledge, it runs diagonally through—just catching a small section of the township southeast of Eagle Mills. It doesn't go through the township to Marquette, but extends down through into Sands Township, and to the north side of Goose Lake, in Richmond Township.

I knew they had made explorations on the Harlow farm in Marquette, but didn't know the result. According to my knowledge, I wouldn't say that it runs to Marquette at all.

When exploring they have to have some formation in the vicinity. 90% of the farm at Eagle Mills is clear of stumps and could be cultivated; it is not under cultivation now; different ones have been cutting what hay is practically growing wild there. The adjoining lands around there are practically second growth poplar—under-brush. I value them at \$3,50 to \$4 an acre, and the cleared lands at \$6. I think the land where the underbrush is could be cleared for \$10 to \$12 an acre.

MACKENZIE.

Redirect examination.

By Mr. Wykes:

That land is medium quality sandy soil. Part of that land would not warrant the expenditure of \$12 an acre on it for clearing, and part of it would. There are old pine stumps scattered here and there on that farm which I have said was cleared. There are only a few farms in the township, and most of the farmers have to work in the mines, in order to make a living.

These lands can be bought for the prices I have named. 1158 I have considered the land worth, to anyone, the amount for

which it can be bought.

MACKENZIE.

Recross-examination.

By Mr. Eldredge:

I have inquired from the Cleveland Cliffs Iron Co., and got the prices on different land there, for myself and others. I never tried to purchase any piece of land that lay along the South Shore, any-

I understand they cut between 17 and 20 tons of hay off of about 100 acres of that land at Eagle Mills, cutting wherever there was enough to warrant it. The hay is not wild but was put under cultivation when F. W. Read was there.

They were experimenting, recently, on three or four acres between

a quarter and a half mile from the track, trying to grow alfalfa. The Read farm has only a few acres on the south side of the track, where the right of way runs through, and that was practically all The farm runs from the track, back north, and a sawdust dump. extends about a quarter of a mile on the north on that side. If that farm was re-plowed and re-seeded, it might raise one-half to one ton of hay an acre, and the general average price of hay is \$12 a ton.

They have not been farming there for four or five years. The cost of cultivating, seeding and harvesting the crop brings the cost of hay up to a good deal more than you could buy it for.

I was employed in China, by Jardine-Matthewson of London, and also by the Chinese Government, direct, Yuan Shukai, who is now President of China being the managing director. My duties were those of a mining engineer. I was in China two years, working for the government about 14 months, and for Jardine-

Matthewson and the Pekin Syndicate the balance of the time.

I went to Mr. Townsend, the land agent of the Cleveland Cliffs Co. and asked him what they would take for those lands, and he said about \$3.25 to \$6 an acre—any of it. I wanted to buy three or four forties near Goose Lake, but he said they were in their timber shed, Then I talked it over with him about some other and were reserved. lands that I have had in view there, that we wanted to purchase for pasture lands and fence in, and he said that any of that land there was from \$3.25 to \$6 an acre. Those lands are even, adjoining the right of way, from the right of way right back through that flat called the Eagle Mills flat.

MACKENZIE.

Recross-examination.

By Mr. Eldredge:

Mr. Townsend told me this about two months ago. I didn't ask him about any particular acreage, but this price that he gave me was on any of that land through there. I asked him about the lands adjoining South Shore and L. S. & I. rights of way, and all the land in that neighborhood known as the Eagle Mills flat, and down around Morgan Heights, and south towards Goose Lake. He said he would

be glad to get rid of it for \$3.50 to \$6 an acre.

I attended St. John's Military Academy, Delafield, Wis., for two
years, being about 18 or 19 years old when I got through. During
my vacations and after I finished, I was all over the country, getting
practical experience. When about 26 years old, I took certain expractical experience.

aminations and got credit at the Houghton School of Mines, 1160 but did not enter. At that time, I had been in the Philippines; had been with the Drummond interests of Montreal, in superintending their exploration work, where I stayed four months.

I was, next, an assistant to the geologist in the Department of the Minister of Mines, in Ontario, where I was six months in exploring and superintending. We did diamond drilling and test pitting for all the metals in the Rainy Lake, Port Arthur and St. Mary districts. my headquarters being in Toronto. We had six or seven scattered prospects, and I went from one to the other, being in charge. My business was to go from one place to the other, make my reports, locate my holes, and superintend the work.

After that, I was in the Philippines seven months as a coal mining expert, under the War Department. I had previously been in China,

where I went in 1904. I went to Ontario in 1907.

The first work I did after I left St. Johns was for George Maas, at Negaunee, where I worked as an assistant on a diamond drill. I next went to the Cleveland Cliffs Co., in Negaunee, where I did the same work. I next went to the Mesabe Range, where I did the same work. I next worked for the Republic Iron and Steel Co., at Negaunee, at diamond drilling, going from there to South Africa for geological work and diamond drill contracting for S. Nuiman and Company of London. I stayed there 22 months, returning in the fall of 1903.

I went to Houghton for those examinations when I was about 26.

It was about the time I went to the Philippines.

After I returned from South Africa, in 1903, I went to China, in
May, 1904, where I stayed about two years, where I was in
1161 charge of diamond drilling, and a coal mining expert. I did
not personally run a drill. I next went to Canada. These
different positions were obtained through the Sullivan Machinery Co.,
cf Chicago. The drills used on the work were usually the Sullivan
Diamond Drills. In the Philippines, I was coal mining expert, in
charge, and acting as consulting engineer in all the work, with no
one over me but the War Department. I was there for seven months,
and spent about five months in addition for the Government, in Illinois, Michigan, New Hampshire, Pennsylvania, California and Colorado, getting my men and machinery for the work in the Philippines. I also went to Mexico, for the Mazapil Copper Co., doing
diamond drilling and consulting work.

That is all my mining engineering experience, except that I have been consulted on geological formations and the prospect for minerals.

1162

On April 17, 1914.

WILLIAM PIERCE, a witness called by defendants.

Direct examination.

By Mr. Wykes:

I live at the National Mine, Tilden Township; I have lived in that Township 12 years, and in that vicinity 37 year. I lived at the Lake Angeline location, south of and near Ishpeming, before I came to Tilden Township. This is my second term as Supervisor, and I have made one assessment.

I know the South Shore line as it runs through that township. It crosses sections 17 and 18-47-27. The lands along the railroad in those two sections are sandy, with no farms; it is mostly covered with undergrowth of poplar and scrub-spruce; there are a few pine stumps

remaining.

In my judgment, the land along South Shore through those two sections is worth \$3 an acre. I assessed them at \$3 an acre, except the northwest quarter of section 18, which I put at \$5. Those figures represent my judgment of the cash value of that land, and are my last year's assessment. The Tax Commission raised these values, but I don't remember their figures.

PIERCE.

Cross-examination.

By Mr. Eldredge:

I am a miner, and work at the Iron Mountain Lake Mine, for the Jones & Laughlin Ore Co. That is about three miles from the Lake

Angeline property in Ishpeming.

I think the Iron Cliffs Co. owns all the land through there in sections 17 and 18. I never bought or sold any land in Tilden Township, and know of no sales in sections 17 or 18. I valued it principally on the character of the soil.

1163 On April 17, 1914.

CHARLES J. JOHNSON, a witness called by defendants.

Direct examination.

By Mr. Wykes:

I live at Diorite, west of Ishpeming, in Ely Township, of which this is my second term as Supervisor. I have made one assessment, and am about to make another. The South Shore runs through sections 13, 14, 15, 16, part of 17, 8 and 7, town 47-28, in that township.

I have been over the land adjacent to the railroad, often, and know its character very well. It has been cut over years back; there is a great deal of second growth on it, and one farm, along the track, called the Low Moor. It is on sections 16 and 9, and belongs to E. C. Anthony, of Negaunee. There are no other farms along the line of the road, except a few small patches at Clarksburg, which is on section 7. I know the value of the land along the line of the road through that township. In my judgment, it is \$3 an acre, on the average. That is for the cut-over lands, and all the way through, alongside of the right of way. They are all cut-over lands, except Low Moor farm, which extends about a mile and a half along the track. That farm is now under cultivation. The Tax Commission placed values above mine. In my judgment, the values which it placed are too high.

JOHNSON.

Cross-examination.

By Mr. Eldredge:

I am a surface foreman for the American Boston Mining Co., at Diorite. 16 or 17 years ago, I bought 80 acres in section 10-48-28, which is away from the railroad. That is the only piece of land I have dealt in in Ely Township. I was summoned here as a witness. Before that, a letter was written to me from the Attorney General's

office to make a report, which I did not do.

don't think that the buildings alone are worth that. I arrived at the valuation by former assessments, a great deal—used my own judgment, combined with the former assessment, which was the same amount. I have no exact idea of the value of the buildings. The land itself is worth about \$3 an acre; I don't know the acreage, but it runs about a mile alongside of the railroad track, and is about a quarter of a mile wide in some places and a half mile in others, most of it being perfectly clear. In my judgment, it is no more valuable than the other land along the road, as it is in a big bog, and very seldom can any crops be raised on it. They get mostly marsh hay off of it; that answers for feeding purposes; I have bought it for \$6 a ton, delivered.

The soil at Clarksburg is a sandy loam, and capable of cultivation, but it is all cut up into small parcels, 10 acres being the most which can be cultivated. I put that in at \$3 an acre, as an average with the rest, and assessed it at \$3. The land there that is cleared and can be cultivated lies along the railroad, and is more valuable than the rest. I think it is worth about \$3 an acre; I valued it at the same figure, whether it was in one, forty or eighty acre pieces. That covered the land—not the house. I have never valued that separately. I couldn't do that. I have taken them all, as a forty or an eighty, and valued them all at the same figure. There is hardly any cleared there, with the exception of Low Moor farm, and

some of those tracts at Clarksburg.

JOHNSON.

Redirect examination.

By Mr. Wykes:

In making my estimate, I put an average value on the forty or the eighty, and did not attempt to separate, in any case, the cleared land from the rest.

1165

On April 17, 1914.

JAMES KENNAUGH, a witness called by defendants.

Direct examination.

By Mr. Wykes:

I have lived 2½ years at Humboldt; before that I lived 22 years in Ishpeming. I now have charge of the Barron mine at Humboldt, and have been Supervisor of Humboldt Township for two years, having made two assessments. This is my third term. I am familiar with the right of way of the South Shore through that township, and know the character of the land through which it runs.

The main line goes through sections 1, 2, 3, 4-47-29. I am familiar with the value of the lands along the right of way in that township. I have figured up the value through the four sections, and think the average is between \$6 and \$7 an acre, on the main line, taking the average value on both sides through the township along

South Shore.

In getting at this average, I placed the S. ½ of the S. E. ¼ of section 1 at \$5 an acre, the N. ½ of the S. E. ¼ at \$5 an acre, the N. ½ of the S. W. ¼ at \$9.37 an acre, including mineral possibilities, the S. ½ of the S. W. ¼ at \$15 an acre, including mineral possibilities, the N. ½ of the S. E. ¼ of section 2 at \$6.50 per acre, the S. E. ½ of the S. E. ¼ at \$17.50, the N. ½ of the S. W. ¼ at \$6.50, the S. E. ¼ of the N. W. ¼ at \$3.25, and the S. E. ¼ of the N. W. 1/4 at \$6.50.

The land along the railroad throughout section 3 is swampy. In that section, I valued the S. E. 1/4 of the N. E. 1/4 at \$3.25, the S. W. 1/4 of the N. E. 1/4 at \$3.25, the S. E. 1/4 of the N. W. 1/4 at \$3.25, and the N. 1/2 and the S. 1/2 of the S. W. 1/4 of the N. W. 1/4 at \$3.25,

\$3.50. I valued the N. 1/2 of section 4 at \$3.40 an acre.

Land along the railroad in section 2 is also swampy. no timber on any of this land in these three or four sections.

1166 KENNAUGH.

Cross-examination.

By Mr. Eldredge:

None of the forties named cover the Baron mine. Pessibly, in section 1, a small part of the Republic branch, where it leaves the main line, might be included. I have put the property on the as-

sessment roll at the figures named. I was a miner on section 16, at Ishpeming, before I went to Humboldt. I was elected Supervisor within a year after moving, and at that time had no particular knowledge of the values of lands in Humboldt Township. Since then, I have not dealt particularly in land there, except adjacent to the Baron mine. In a good many instances, I followed the valuations put on land by my predecessors.

I had some knowledge of values, and made some changes, but none in the land along South Shore. In a conversation I had with you (Eldredge) I said I had no knowledge of a mineral formation along the main line of South Shore or just east of Humboldt. When I valued the mineral possibilities, I did so on the judgment of my predecessors, and not on my own. I had not changed any valuations on mineral land there.

The Baron mine is in section 11-47-29, as is the Republic branch of South Shore. The Baron mine is on the whole N. W. 1/4 of sec-

tion 11, and that 160 acres is valued at \$51,000.

The South Shore passes over one forty. The Webber lands are in section 2, and the South Shore passes over two forties, which are valued at \$12,000, on account of the presumed mineral values. That valuation was on the property before I came. I don't know

what value I placed on the right of way across the Baron mine in a conversation I had with you; the Baron mine forty is the most valuable that South Shore passes through.

In assessing the lands of mining companies, I did not assess the property on which the mines were located and then have that include the value of the minerals, if any, in other lands that the company owned in the same township. Each piece of land was assessed separately. My valuation on the Baron mine property was \$43,000. The State Board of Tax Commissioners raised it to \$51,000. As a general rule, they raised my valuations, but not very much, and some they lowered a little. The valuations given by me in answer to Mr. Wykes' questions were my own, and as I originally placed them on the roll.

KENNAUGH.

Redirect examination.

By Mr. Wykes:

The Tax Commission got their values higher than I thought the land was worth—too high in some instances. The Baron mine assessment covers land, minerals and improvements. The Webber description, assessed at \$12,000, includes mineral value, and many thousands of tons have been mined there.

The figures I have given represent my own judgment of value. I figured that on the Baron mine property my figures are high enough, and that the State Tax Commission is \$8,000 too much.

(Mr. Eldredge takes witness out for a consultation, with a view to making him his witness, and states that it isn't the first time he has consulted with him.)

In my judgment, the value of the right of way of South Shore through the forty acres on which it crosses the Baron mine property is just what the assessment roll says per acre on the Baron

mine property and on section 2. 1168

In our conference, Mr. Eldredge figured that the land was worth \$75 an acre for a right of way over this property. On the sheet which Mr. Eldredge gave me, the \$12,000 was divided by 80 acres, and \$150 set opposite, as the quotient. He showed me that. There was on that sheet, also, \$51,000, which was divided by 160, the quotient being \$300, which he also showed me. Those assessments cover the land and the minerals, and the minerals do not belong to South Shore.

KENNAUGH.

Recross-examination.

By Mr. Eldredge:

I consulted with you (Eldredge) about the value of those lands, in your office months ago. When I said that the value of the right of way was \$150 an acre, I really meant \$75, as I told you in our consultation that the right of way was worth about half the value of the land and its minerals. In the same way, I told you that the value of this right of way across the Baron mine was about half the value of that mine, or about \$150. That is the conversation we had, both in your office and in the hall. You simply asked me what I told you in your office.

KENNAUGH.

Redirect examination.

By Mr. Wykes:

I think it was Mr. Eldredge who first suggested taking one half for the mineral and one half for the right of way.

KENNAUGH. 1169

Recross-examination.

By Mr. Eldredge:

Of course, it was a verbal conversation, but I think you suggested In soft ore, the value of the right of way would be the value of the ore it would tie up. I told you that the Baron formation was hard, and wouldn't tie up more than there was under the right of way—perhaps not that much. Q. The \$75 and \$150 you have given there is your judgment of

the valuation, is it not?

A. When I come to think about it, and when you mention it, I

know we did have a conversation of that description.

Q. Then whose judgment was it, yours or mine, that you are testifying to?

The Master: Do you understand the question?

A. I understand it. Of course, I don't know just what is was; it might have been a suggestion from you, in the first place; I don't say but what it was; it might have been; but I remember talking about that the right of way on the Baron mine was not a detriment to taking the ore out-not like soft ore mines.

Q. But the question is the value; whose judgment is that; is it your judgment that the value is as you have stated-\$75 and \$150

respectively?

A. Why I should say it would be \$75 on that particular property.

Q. That is your judgment?

A. Yes.
Q. How about the other property—the same way?

A. All the Humboldt property is about the same formation-hard.

1170 KENNAUGH.

Redirect examination.

By Mr. Wykes:

We are now mining about 300 feet under the track at Humboldt. It is about 600 feet perpendicular, and so deep that there is no danger of a cave-in.

I never saw you before you came into the courtroom here, today, and you never talked with me about the values that I placed on this

I didn't take into consideration the fact that the right of way might be moved off, to a nearby location, when I said that the value of the right of way might be the value of the ore under it. That wouldn't be necessary at Humboldt.

1171

On April 20, 1914.

L. J. LE VEQUE, a witness called by defendants.

Direct examination.

By Mr. Wykes:

I live in Marquette, where I am in the real estate business. I am

handling rural land, mostly.

I own the S. E. 1/4 of the N. E. 1/4 of 12, 47-23, near Sand River station, Marquette County, which I will sell for \$5 an acre. It is worth about that.

I own the S. W. 1/4 of the N. E. 1/4 and the S. E. 1/4 of the N. W. 1/4 in section 3, 47-29, Humboldt Township, Marquette County. That is in a swamp, and I would consider it worth about \$6 an acre.

I own property in the West End Add., in Marquette, and will sell

it for just about what it is assessed at.

I have a one-half interest in the N. E. 1/4 of the S. W. 1/4 of section 15, in Marquette, 38.21 acres. I will take \$50 an acre for my interest. It is in 15, 48-25.

I sold some lots in block 10 of Nester's Add., in Marquette, for \$20

to \$30 a lot.

I sold lots 1 and 2 in block 1 in the West End Add., on Washington St., at \$115 each.

LE VEQUE.

Cross-examination.

By Mr. Eldredge:

I deal chiefly in timber land. Where I have cut-over land, it is generally where I have sold or removed the timber. In Humboldt Township, the lands that I own do not include the mineral rights.

1172

On May 4, 1914.

F. J. Burtless, a witness called by defendants.

Direct examination.

By Mr. Wykes:

I live at Lansing, where, for ten years, I have been Secretary of the Board of State Tax Commissioners and State Board of Assessors. I have been connected with the State Board of Tax Commissioners con-

tinuously for 14 years.

The Board has, every year since the law went into effect, employed a competent stenographer to report all testimony and statements made by the representatives of the different railroad companies upon review. This testimony has been transcribed and bound, and is a part of the records of the office. The attorneys are always sworn before they give those statements; it is the intent to have the statements made under oath. The stenographic report was made for each year, from 1902 until the present time. I think Glenn L. Williams was the stenographer each year until the last three or four years. He is now circuit court stenographer in Lenawee County. After the statements made on review are taken, they are always written up.

(Mr. Eldredge objects to the testimony as irrelevant and immaterial, and as having no tendency to prove the correctness of the notes, which cannot be proved except by the stenographer or some one who heard the statements.)

As Secretary of the Commission, I have the typewritten notes of those reviews, which are considered records of the State Board of Assessors. They are frequently referred to by members of the Board, and are regarded by the Commission and by the employees in the office, and by those called upon to use them, as nearly correct as it is possible to get them.

A transcript of the stenographic report does not show, in all cases, whether the representatives were sworn, or not, and there is nothing to show that Mr. Eldredge was sworn when he appeared before

the Board, on Jan. 7, 1903. The law governing the assessment of railroad property provides the date upon which an as-

sessment must be made, and then provides that for a certain length of time these assessments shall be subject to review, during which time the representatives of railroad companies may appear and make such statements as they desire; it is these statements that are taken down stenographically.

BURTLESS.

Cross-examination.

By Mr. Eldredge:

It does appear that in some cases they were sworn.

(Mr. Wykes produced a printed copy of the report of the land department of the D. M. & M. R. R. Co., being a cumulative statement from Feb. 1879, to Jan. 1, 1912, and asked to have it marked Defts.' Ex. 65. He stated, further, that he assumed plaintiff had a duplicate, or an authenticated copy, and called on plaintiff to produce it. Mr. Eldredge stated that he had no such copy, and knew nothing about any part of the report, except one item.)

1175

On May 4, 1914.

THOMAS McCORMICK, a witness called by defendants.

Direct examination.

By Mr. Wykes:

I live in Lansing, where I work for the State Board of Assessors. I have access to the different reports of the railway companies to that Board, and have recently taken certain of the figures for operating expenses for different railroads from those reports and tabulated them; the tabulation is embraced in nine sheets. For the companies named in those sheets, I took off the operating ratio, the maintenance of way, maintenance of equipment, traffic, transportation, and general, expenses, and the total.

The first company named is the D. S. S. & A., for which I have two tabulations, the first being for the system and the other for Michigan.

For all the other railroads named the figures are for the system. In each instance, I kept the reports for the years 1908 to 1913 inclusive, except the Detroit, Bay City & Western, which has had but two or three years' operation, and the Soo Line, the 1909 and 1910 reports of which were not in the office when I made the compilation. Under the item of expenses in each instance, I have included another set of figures which represents the percentage which that item bears to the total. Everything else but those percentages appears in the reports. I computed the percentage, myself, and have checked all the figures, to see that they are correct.

(Mr. Eldredge objects to the introduction of the compilation, but admits he may be inconsistent if plaintiff has put in similar compilations to prove its case.)

(The compilation is set forth in full as follows:)

	Total. \$2,206,215 100%	1,979,518	2,269,247 $100%$	2,269,341	2,395,161	2,724,490
	General expense. \$71,328 3.23%	78,491 3.97%	79,016 3.48%	82,821 3.65%	$\frac{112,038}{4.68\%}$	117,694
tem)	Transportation expense. \$1,136,354 51.51%		1,193,180 52.57%			
Atlantic (Sys	Traffic expense. \$85,274	100,884 $5.10%$	107,909	118,982 $5.25%$	121,764 $5.08%$	119,642 $4.39%$
South Shore & Atlantic (System)	Maintenance of equipment. \$351,855 15.95%	327,790 $16.56%$	361,459 $15.93%$	359,552 15.84%	360,164 15.04%	411,864 15.12%
Duluth,	Maintenance of way. \$561,404 25.45%	445,281 22.49%	527,683 $23.25%$	512,170 22.57%	. 575,766 24.04%	716,711 26.31%
	Operating ratio. 75.51	72.79	68.72	72.07	75.98	79.83
1176	Year. 1908	1909	1910	1911	1912.	1913

Duluth, South Shore & Atlantic (Michigan)

				E	General	
perating ratio. 71.51	Maintenance of way. \$468,171 25.45%	Maintenance of equipment. \$293,422 15.95%	Traffic expense. \$71,112	Transportation expense. \$947,637 51.51%	\$59,482 3.23%	Total. \$1,839,824 100%
60.28	368,713 $22.49%$	$\frac{271,425}{16.56\%}$	83,536 $5.10%$		64,994 3.97%	1,639,128
64.88	439,658 $23.25%$	301,162 $15.93%$	89,908		65,835 3.48%	1,890,703
69.29	418,276 $21.96%$	298,954 15.70%	98,339 $5.16%$		68,376 $3.59%$	1,904,478
72.00	454,032	302,391 15.13%	99,922 $5.00%$		95,406	1,998,005
75.98	581,520 $25.68%$	341,173 $15.06%$	98,408		100,640 $4.44%$	2,264,826 $100%$

Mineral Range

Total. 688,865 100%				645,517	
General expense. 14,938 2.17%	15,329 2.19%	$\frac{15,719}{2.13\%}$	15,343 $2.17%$	16,500 $2.56%$	17,051 $2.51%$
Transportation expense. \$386,550 56.11%					
Traffic expense. \$7,041	7,249 $1.03%$	7,920 $1.07%$	5,893	5,786	5,393
Maintenance of equipment. \$144,088 20.92%	132,877 $18.95%$	144,424	131,561 $18.59%$	127,389 19.73%	131,932 19.40
Maintenance of way. \$136,248	147,462 $21.04%$	$\frac{170,098}{23.03\%}$	183,746 $25.97%$	124,968 $19.36%$	153,690 22.60
Operating ratio. 85.46	84.83	89.37	94.80	83.81	80.53
Year. 1908	1909.	1177 1910	1911	1912	1913

Minneapolis, St. Paul & Sault Ste. Marie

Year.					The state of the s	Conoral	
	Operating ratio. 64.29	Maintenance of way. \$1,330,856 18.79%	Maintenance of equipment. \$1,361,625 19.23%	Traffic expense. \$235,675	Transportation expense. \$3,953,952	\$199,009 2.81%	Total. \$7,081,117 100%
	56.03	:		:		:	:
	:		:		:		:
1911	68.09	2,355,569 $16.06%$	3,153,145 $21.49%$	542,308	8,123,936 55.37%	495,696 3.38%	14,670,654 100%
1912	60.31	2,721,724	3,340,512	562,727 $3.56%$	8,647,290 54.65%	550,154 3.48%	15,822,407 100%
1913	59.34	3,469,510	3,970,817 21.10%	645,883 3.43%	10,054,734 $53.42%$	681,862 $3.62%$	18,822,807 100%

Chicago, Milwaukee & St. Paul

Total. \$37,163,368 100%	38,731,239 100%	44,790,997	47,053,719 100%	\$57,743,150 100%	56,899,623 100%
General expense. \$839,028 2.26%	1,073,385	1,123,610 $2.51%$	1,118,709 $2.38%$	\$1,141,384 2.39%	1,263,904 $2.22%$
Fransportation expense. \$21,360,567 57.48%	21,764,471 56.19%	26,347,283 $58.82%$	27,965,953 59.44%	\$26,842,051 $56.22%$	31,676,106 $55.67%$
Traffic expense. \$1,281,683	1,334,006 $3.45%$	1,122,710 $2.51%$	1,264,272 $2.69%$	\$1,266,136 2.65%	1,610,263 $2.83%$
Maintenance of equipment. \$7,039,270 18.94%	7,270,774	7,724,569	8,839,384	\$9,681,271 20.28%	$12,641,964\\22.22\%$
Maintenance of way. \$6,642,820 17.87%	7,288,603 $18.82%$	8,472,825 $18.92%$	7,865,401	\$8,812,314 18.46%	9,707,386
Operating ratio. 65.28	64.66	69.07	72.42	75.64	68.90
Year. 1908	1909	1910	1911	1178	1913

Chicago & Northwestern

Total. \$41,641,313 100%	43,191,240 100%	52,153,619 $100%$	53,012,710 100%	52,701,843 100%	58,252,780 100%
General expense. \$1,086,043 2.61%	1,128,279 $2.61%$	1,294,954 $2.48%$	1,634,864 $3.08%$	1,498,245 $2.84%$	1,592,858 2.73%
Transportation expense. \$24,643,194 59.18%	24,666,863 57.11%	$29,677,354 \\ 56.91\%$	30,836,561 58.17%	30,924,938 57.68%	32,241,258 $55.35%$
Traffic expense. \$1,080,580	1,127,864 $2.61%$	1,257,756 $2.41%$	1,232,016 $2.32%$	1,340,086 $2.54%$	1,348,982 $2.32%$
Maintenance of equipment. \$6,774,950 16.27%	7,845,969	9,149,217	9,307,196	9,569,853	$11.568,496\\19.86\%$
Maintenance of way. \$8,056,546 19.35%	8,422,265	10,774,338 $20.66%$	10,002,073	9,368,721	11,568,496 19.74%
Operating ratio. 65.87	65.46	70.31	70.76	71.51	70.15
Year.	1909	1910	1911	1912	1913

Copper Range

Year. 1908	Operating ratio.	Maintenance of way. \$196,929 32.64%	Maintenance of equipment. \$98,961	Traffic expense. \$14,942 2.48%	Transportation expense. \$274,541 45.51%	General expense. \$17,907 2.97%	Total. \$603,280 100%
1909	70.75	207,747			251,717 46.45%	24,271	541,953
1910	58.80	119,874			245,384 55.78%	27,954 6.36%	439,908
1911	69.60	118,752			252,931 $52.00%$	26,742	486,362
1912	65.10	113,043			237,493 $50.36%$	28,853	471,617
1913	64.20	105,639 $21.39%$			239,108 $48.46%$	5.58%	493,411 100%

Ann Arhor

	Total. \$1,375,597 100%	1,197,313	1,298,768 $100%$	1,305,374 $100%$	1,419,448	1,435,084
	General expense. \$34,622 2.51%	48,359	64,222	85,194	93,568	87,215 6.07%
	Transportation expense. \$767,682	662,157 55.30%	642,806	666,734 $51.08%$	800,711 56.41%	743,899 51.84%
L	Traffic expense. \$34,265 2.49%	38,214 3.19%	46,981 3.62%	48,587	50,442 3.55%	49,641
Ann Arboi	Maintenance of equipment. \$347,457 25.26%	193,865	246,453 18.98%	245,415 18.80%	236,678 $16.68%$	259,188 18.06%
	Maintenance of way. \$191,571 13.93%	254,718	298,306 22.97%	259,444 19.87%	238,049 16.77%	295,141 $20.57%$
	Operating ratio. 73.06	70.07	69.97	67.47	66.94	69.23
	1179 Year. 1908	1909.	1910	1911	1912	1913

Chicago, Detroit & Canada Grand Trunk

	Total. \$636,424 100%	589,966	633,420	698,016	804,863	860,944	
	General expense. \$10,717						
	Transportation expense. \$349,918 54.98%	337,543 57.21%	364,394 57.53%	407,765	459,803	552,445 64.17%	
*	Traffic expense. \$19,871	23,693 $4.02%$	23,320 $3.68%$	21,783 3.12%	22,476 2.79%	23,627	
	Maintenance of equipment. \$101,830 16.00%	85,306 14.46%	138,559 $21.87%$	126,491 $18.12%$	151,014	150,842 17.52%	
	Maintenance of way. \$154,088	128,387	89,305	123,737	152,252 $18.92%$	113,055 13.13%	
	Operating ratio. 166.19	120.58	99.50	95.58	87.43	87.47	
	Year. 1908	1909.	1910.	1911	1912	1913	

Detroit, Bay City & Western

[money	F	\$3,586 \$50,713 7.07% 100%			•			33,400 849,452 3.93% 100%		36,879 898,113 4.11% 100%	34,942 846,695 4.13% 100%
7	Transportation expense.	\$29,116 57.41%	25,423 55.56%		\$422,446	0/ =0.30	371,944 46.72%	392,788	385,414		443,602
	Traffic expense.	\$1,916 3.78%	2,026	kinac	\$24,546	3.04%	22,320 $2.80%$	3.13%	3.17%	29,504 3.29%	26,969
	Maintenance of equipment.		7,861	Detroit & Mackinac	\$189,060	23.42%	185,230	196,888	203,439	218,290	
	Maintenance of way.	ced Operation \$7,336	47.73 7,018 15.34%		\$144.244	17.87%	183,863	199,827	174,573	201,752	166,415
	Operating	(Commen 59.67	47.73		68 07		69.59	68.89	69.87	71.89	68.16
		Year. 1911	1913		1180	1908.	1909.	1910	1911	1912	1019

Detroit & Toledo Shore Line

Total. \$480,149 100%	100%	459,751 100%	481,783	342,277 100%	639,655
General expense. \$16,497	18,382	21,291	22,009	24,348	28,426 4.45%
Transportation expense. \$241,569 50.31%	234,812 $52.21%$	255,298 55.53%	277,103 57.52%	337,270 $62.20%$	375,047 58.63%
Traffic expense. \$7,754	$\frac{11,260}{2.50\%}$	14,126	14,992	13,757	14,739 $2.30%$
Maintenance of equipment. \$107,706 22.43%	61,658	54,853 11.93%	51,974	57,926 10.68%	46,065
Maintenance of way. \$106,623	123,664 27.49%	114,183	115,705	108,976 $20.10%$	145,378 22.73%
Operating ratio. 54.66	58.47	50.32	50.45	46.09	47.22
Year. 1908.	1909	1910	1911	1912	1913

Grand Rapids & Indiana

Total. \$3,610,410 100%	3,407,126 100%	3,888,291	4,062,734	4,034,119	4,370,062
General expense. \$161,302 4 . 4 7%	167,658	168,007 $4.32%$	176,642	179,565	190,195 4.35%
Transportation expense. \$1,882,524 52.14%	1,827,571 53.64%	2,051,282 52.76%	$2,\!228,\!233\\54.84\%$	2,233,928 55.37%	2,343,055 $53.62%$
Traffic expense. \$120,013	122,088 $3.58%$	137,531 3.54%	144,547 3.56%	135,968 $3.37%$	139,532 $3.19%$
Maintenance of equipment. \$772,713	719,420 $21.12%$	884,733 22.75%	853,489 $21.01%$	882,930 $21.89%$	919,817 $21.05%$
Maintenance of way. \$673,859 18.66%	570,390	646,739 16.63%	659,824 $16.24%$	601,728 $14.92%$	777,462 17.79%
Operating ratio.	73.98	76.37	80.12	77.84	79.18
Year.	1909.	1910	1911	1912	1913

Lake Shore & Michigan Southern

Total. \$26,874,570 100%	26,120,940 100%	31,485,414 100%	34,721,326 100%	32,662,751 100%	38,543,617 100%
General expense. \$697,405	700,642 $2.68%$	794,851 $2.52%$	956,830	946,698 $2.90%$	1,046,283
Transportation expense. \$14,182,104	13,200,039 $50.54%$	15,884,763 $50.45%$	$17,\!110,\!669$ 49.28%	$\frac{16,818,102}{51.49\%}$	$18,965,469 \\ 49.20\%$
Traffic expense. \$1,055,389	1,006,575	1,113,568 $3.54%$	1,144,372 $3.30%$	987,347	1,020,739 $2.65%$
Maintenance of equipment. \$5,152,284	6,184,634 $23.68%$	7,449,964	7,580,622 $21.83%$	8,255,521 $25.28%$	10,363,121 26.89%
Maintenance of way. \$5,787,388	5,029,050 $19.25%$	6,242,268 $19.83%$	7,928,833	5,655,083	7,148,005 $18.55%$
Operating ratio. 66.07	62.96	64.81	71.66	64.47	66.14
Year. 1908	1909.	1910	1911	1912	1913

Michigan Central

	Total. \$17,830,103 100%	17,636,433 100%	19,629,657 100%	22,329,787 100%	\$21,438,108 100%	24,906,203 100%
	General expense. \$433,860 2.43%	422,376 2.39%	511,286 $2.60%$	593,022 $2.66%$	\$548,603 2.56%	624,524 $2.50%$
	Transportation expense. \$10,307,224 57.81%	9,783,206	10,858,320 $55.31%$	$12,503,868 \\ 56.00\%$	\$12,461,699 58.13%	14,110,794 56.66%
	Traffic expense. \$760,833	731,652 $4.15%$	828,897	848,955 3.80%	\$770,921 3.60%	801,007 $3.22%$
William Burn	Maintenance of equipment. \$3,242,091	3,597,475	3,778,126	4,341,404	\$4,232,529 . 19.74%	
	Maintenance of way. \$3,086,095	3,101,724	3,656,027	4,042,539	\$3,424,356 15.97%	4,199,116
	Operating ratio. 69.50	69.21	68.13	75.02	70.40	68.40
	Year. 1908	1909.	1910	1911	1182	1913

Pere Marquette

	Operating ratio.	Maintenance of way.	Maintenance of equipment.	Traffic expense.	Transportation expense.	General expense.	Total.	
1908	76.15	\$1,658,834 15.91%	\$2,043,043 19.59%	\$306,096	\$6,104,379	\$314,439	\$10,426,791 100%	
606	71.33	1,669,220	2,018,494	349,971	5,712,493	357,017	10,107,195	
		16.52%	19.97%	3.46%	56.52%	3.53%	100%	
1910	70.04	1,932,437	2,117,700	420,298	6,370,632	362,173	11,203,240	
		17.25%	18.90%	3.75%	56.87%	3.23%	100%	
	80.43	2,123,296	2,550,859	467,790	7,292,092	424,373	12,858,410	
		16.51%	19.84%	3.64%	56.71%	3.30%	100%	
1912.	80.41	2,064,891	2,804,938	423,916	7,707,865	407,194	13,408,804	
		15.40%	20.92%	3.16%	57.48%	3.04%	100%	
1913	79.89	2,944,517	2,987,156	400,347	7,146,827	427,575	13,906,422	
		21.17%	21.48%	2.88%	51.39%	3.08%	100%	

St. Clair Tunnel

Year. 1908.	Operating ratio. 46.09	Maintenance of way. \$15,733	Maintenance of equipment. \$18,612	Traffic expense.	Transportation expense. \$106,075	General expense. \$72	Total. \$140,492 100%
1909	38.50	23,120 $21.67%$	22,522 $21.11%$		57,863 54.23%	3,186	106,691 $100%$
1910	39.44	42,051 $37.15%$	13,386 $11.83%$		54,565 48.20%	$\frac{3,197}{2.82\%}$	113,199
1911	35.99	34,512 32.73%	12,861 $12.20%$	* 0 * 0 * 0 * 0 * 0 * 0 * 0 * 0 * 0 * 0	54,883	3,197 $3.03%$	105,459
1912	28.48	10,579 $12.51%$	11,340		59,408 $70.26%$	3,232 $3.82%$	84,559
1913	27.75	13.242	14,993		69.05%	1,670 $1.72%$	96.621 $100%$

1183 I have now the reports from which these figures were taken. and will produce for Mr. Eldredge any of them which he desires in order to get the figures that he says are material.

McCormick.

Cross-examination

By Mr. Eldredge:

The figures given first are for the D. S. S. & A., entire system; next, for the same road in Michigan; next, the Mineral Range, which is entirely in Michigan; next, the Soo Line, which covers the system.

The Soo Line report for 1906 does not detail the mileage as to The total miles operated are 1,039.71, main line, but it does not detail as to states, and I do not know, of my own knowledge. The 1911 report gives main line, Michigan, 191.09 miles, Wisconsin, 262.80, Minnesota, 224.98, North Dakota, 361, and total owned, 1.039.87 miles; total operated 1,798.40. For the year 1908, the total expenditures for maintenance of way in Michigan was \$163,342.84. which is 19.33% of the total; the maintenance of equipment expense was 19.40%; traffic expense, 2.92%; transportation expense, 55.91%; general expense, 2.41%.

We haven't a 1910 report. Mr. Parker gave me that figure of 56.03% for 1909. It was not taken from the records in the office. (Mr. Eldredge moves that the figure, 56.03%, being the ratio of operating expense of the Soo Line, for 1909, be stricken out.)

For 1911, maintenance of way and structures was 21.08%; maintenance of equipment, 20.09%; traffic, 2.97%; transportation, 52.74%; general expense, 3.17%. The 1912 report was missing: we will find it.

For 1913, maintenance of way and structures was 16.87%; 1184 maintenance of equipment, 22.66%; traffic, 2.47%; transpor-

tation, 54.75%; general expense, 3.23%.

I do not know on what basis the Soo Line separates Michigan operating expenses from those for the balance of the system. For 1908, the total operating expense ratio for the Soo Line for Michigan was 75.85%; for 1911, 76.26%; for 1913, 72.36%. I will furnish the figures for 1912, if I can find the report. For 1908, the total main line operating mileage of the C. M. & St. P. was 7,516.33 miles. That was divided as follows: Michigan, 159.12 miles, Wisconsin, 1,774.12, Illinois, 413.45, Iowa, 1,869.95, Minnesota, 1,241.79, North Dakota, 152.76, South Dakota, 1,534.63, and Missouri, 140.27. 1913, the total mileage was 9,321.99, divided as follows: Illinois, 411.92, Wisconsin, 1,765.09, Iowa, 1,868.30, Minnesota, 1,238.60, North Dakota, 378.85, South Dakota, 1,795.54, Missouri, 140.27, Michigan, 167.04, Montana, 818.04, Idaho, 197.31, Washington, The gross revenue from operation in 1908 totalled \$56,-932,620.50, of which \$830,684.07 was from Michigan. Its ratio of operating expense to gross revenue in Michigan is estimated at 87.76%.

I will prepare a statement showing for each year, from 1908 to 1913 inclusive, the gross revenues of the C. M. & St. P., its gross revenue in Michigan, and the ratio of its operating expenses to its gross revenue in Michigan, and divide the maintenance of way and structures, maintenance of equipment, traffic, transportation, and general, expenses, as I have divided it with reference to the system. I will do the same thing with reference to the C. & N. W. separating its mileage into the states through which it operates.

I have prepared the information for which you asked me with reference to the C. M. & St. P.; it is contained in the sheet which I

hand you.

I have prepared the information for which you asked me with reference to the C. & N. W.; it is on the sheet which I hand It is stated in the report that the expenses are proportioned to Michigan on the train mileage basis.

I have also prepared the same information with reference to the Michigan Central, but have taken the information from the reports of that railroad to the Michigan Railroad Commission. pared the same information with reference to the L. S. & M. S.

The Ann Arbor has very little mileage except that which is in The Chicago, Detroit & Canada Grand Trunk Jet. Rv. is about 60 miles long, and a part of the Grand Trunk System; it runs from Port Huron to Detroit. The Detroit, Bay City & Western lies entirely in Michigan, it is a new road, which commenced operation in 1911, but was not assessed for that year.

The total mileage of the G. R. & I. is 522.51 for main line operated, of which 376.14 is operated in Michigan; 313.43 are owned in Michi-

gan, and 53.10 in Indiana.

For 1913, the operating ratio for G. R. & I. was 79.18% for the system, and 77.67% for Michigan. For 1912 the ratio of operating expense was 77.84% for the system and 80.53% for Michigan. In 1913, they were the same, 87.47% for each. In 1910, they were almost the same on the system and in Michigan, there being .34 of 1% difference. In 1909, Michigan was .88 of 1% less than the system.

The Pere Marquette does not separate its operating expenses in Michigan from the system in its reports to the State Board of Assess-

ors. 1186

On May 5, 1914.

EDWARD C. COOLEY, a witness called by defendants.

Direct examination.

By Mr. Wykes:

I have lived at Ishpeming about 27 years; I have been in the real estate and insurance business about 12 years, maintaining offices at both Ishpeming and Negaunee, and acting as agent, and buying and selling lands in and around those places. I have bought and sold lands of my own during that time. I am familiar with South Shore, and the property along it, from the west limits of Ishpeming to the east limits of Negaunee.

From Winthrop Jct. west to the city limits of Ishpeming, I should judge that the land is worth about \$100 an acre. I know very nearly

where the city limits are.

From Winthrop Jct. east to the roundhouses shown on Complt.'s Ex. 15, Riggs, the lands along, South Shore right of way are worth about \$260 ar. acre. From the roundhouses to the point where the line between sections 9 and 10 crosses South Shore, the lands are worth about \$500 an acre. From that point to where the section line crosses the railroad to the first street shown on Ex. 15, the lands are worth about \$500 a lot. There are six or seven lots to the acre; that land could be platted and used for residence purposes.

Between Spruce and Lake Sts., the land is worth about \$800 a lot. Between Lake and Pine Sts., the land is worth about \$1,200 a lot. Between Pine and Main Sts., the lots facing on Canda St. are worth about \$1,400 a lot, while those fronting on Main St. are worth \$150 a front foot. Between Main & First Sts., the short lots next to the railroad are worth \$2,000 a lot. Assuming South Shore station prop-

erty could be divided into Jots, I should think that it would
1187 be worth about \$3,000 a lot. The post office property, directly
southeasterly across the track, contained four lots and a fraction, and sold for \$12,000. I should say the station property was
worth \$3,000 for the same sized lots as those in the post office prop-

erty, which were about 35 by 100 feet.

Just north and east of the station, the railroad is crossed by the line between sections 3 and 10, 47-27. From that point to the east 8th line in section 3, the land is worth \$1,200 per lot. From the east 8th line of section 3 to the section line between sections 3 and 2, 47-27, is not a good location. The lots are worth \$800 each. From the section line between 3 and 2 to the edge of the Jackson Iron Mining Co. plat, which is immediately east of the east 8th line of section 1, the land is worth about \$250 an acre. Only one piece of land by Union park could be platted in that strip. Both ends could not be. Union Park is across the track from, and slightly east of. the Iron Duke, which is marked on the map. There is no uniformity of value through that strip, which is about 134 miles long. I have balanced the property near Union park against the balance, which is low and swampy, and cut by gullies and railroads, so that it is not possible to use it for either farming or residential purposes. I just lumped it, and called it \$250 an acre.

Some portions of Union park are low; the larger portion of it is very level. The center there by Union park would have a considerably higher value than \$250 an acre, taken by itself, while the ends

would have a much less value, taken by themselves.

From the west side of the Jackson Iron Mining Co. plat, which is about on the east 8th line of section 1, 47-27, to Cyr. St., Negaunee, the land is worth about \$300 a lot. From Cyr. St. to the east line of

Pioneer Ave., the land is worth \$75 a front foot on Iron St.

The two lots lying between the railroad track and Lincoln St.
and facing on Pioneer Ave. are worth about \$2,000 each.

From the back end of those two lots east to the point where the new line intersects the old line of South Shore, which is near Healy Ave., the lots on Lincoln St. are worth about \$1,200 each. The land on the south side of the tracks from that strip is level, and might be used for platting, but it is on the wrong side of the track, and is worth about \$800 a lot. The Lincoln St. lots run back to the railroad on the west end, but not on the east. The lots on Jackson St. are worth more than the land behind them, where the railroad is.

From Healy Ave., extended to the track, to the line between sections 6 and 5, the land on the north side of the track could be used for dwelling purposes, and is worth \$400 to \$500 a lot. Immediately on the south side of the track is Ann St., which runs east and west.

The lots on Ann St. are worth about \$800.

From the line between sections 6 and 5, and following the railroad east for one-half mile, the land is worth about \$200 an acre. From that point, which is the quarter line through section 5, going east 80 rods to the 8th line, the land is worth from \$150 to \$200 an acre. From the east 8th line of section 5 east to the city limits, the land is worth not to exceed \$200 an acre. It is low and marshy; you can raise nothing on it but hay; it is too low for potatoes.

My values are placed without reference to mineral values, and

represent only the surface values.

COOLEY.

Cross-examination.

By Mr. Eldredge:

I have not dealt in lands to speak of, from Winthrop Jet. 1189 to the west city limits of Ishpeming; those lands belong to the mining company, and are not for sale. They have, however, in some instances sold the surface rights. Between Winthrop Jet. and the west city limits, there are no mine locations. From Winthrop Jet. east to the roundhouses, there are quite a number of locations. Right at the junction, they are quite thick; from there to the roundhouse, there are very few dwellings. North of the track and west of the cliff shaft, there are not very many houses; that is quite a ways north of the track. Around the turn from the junction to the C. & N. W. roundhouses, there are very few dwellings. Directly north of the roundhouse there are quite a number, but, before you get to it, there are not over six houses on the north side; they are right along the track, between it and the road. On the north side of the county road, there are a good many houses.

I take those locations right along the track into consideration when I fix a value of \$200 an acre; there, it is poor for residence purposes—all cut up with tracks and rock piles, and low, marshy ground, and not suitable for lots. If the tracks were not there, that land could be utilized for dwelling purposes and would be of con-

siderably higher value.

By "location," I mean a group of houses. Between Spruce and Lake Sts. I valued the lots as they are platted, at \$800 each; they

are scarce and the buyer doesn't look at a few feet difference in frontage. The frontage on Main St. of the property where Tillson's drug store is, I valued at about \$150 a front foot. It is one of the most valuable pieces of business property in Ishpeming. I am not certain about the size of those lots; I think they are 33 to 35 feet. I know of a sale of property on the corner of Main and Pearl Sts. It was the Gately lots on Man St. and sold for \$7,500, according to the common talk. \$500 would cover the price of the old frame building, so that the land brought \$7,000 for 35 feet frontage; that makes \$200 a foot

The frontage on Main St. of the Tillson property is just as valuable as the Gately property, for some purposes. Perhaps I told you that the Tillson property was worth \$200 a front foot on Main St. I did tell you that they were of equal value and worth \$200 a front foot, but I think that Gately paid an excessive price for that corner property; it was worth more to him for his

purpose than it would be for other purposes.

The streets from the South Shore station west are First St., Main St., Pine St., Lake St., and Spruce St. I wouldn't want to put a value on that 12 foot right of way of the South Shore through that stretch, because I don't know enough about it; I don't know what it could be used for. The 12 foot strip, where it fronts on Main St., opposite Tillson's, joins the tract of land owned by the C. & N. W., and that land could be utilized all the way to the buildings on the south side of the C. & N. W. track, in case the South Shore track wasn't there. The C. & N. W. joins right onto the back end of the Jenks block. The C. & N. W. strip is a trifle over 100 feet wide fronting on Main St.

Looking at Complt.'s Ex. 15a, Beldon, I should say that the width of the C. & N. W. right of way on Main St. is a trifle over 100 feet.

Q. Is not the frontage of the C. & N. W. railroad on Main St. in Ishpeming, and the frontage of the D. S. S. & A. on that street, of as great value as the frontage of the business property on each side of it?

Mr. Wykes: Just a moment before you answer. I wish to object to it because the question does not present the title as it stands, the title being track rights in a street.

The Master: You may answer the question.

A. I don't think so.

The South Shore property is corner property on the north side, but the C. & N. W. is not corner property. Combining the South Shore 12 feet, and enough of the C. & N. W. to make a 50 foot lot frontage on Main St., and on the corner of Canda, that lot would not be as valuable as the property next north of it. I should prefer to have Tillson's corner to that corner, because it is nearer the hotel; is a more prominent corner. It is right across the narrow street from the Tillson corner. Assuming that the 12 feet owned by the South Shore could be utilized for business purposes and made part of adjoining property, and that the lots were 35 foot front, it would be worth \$125 a front foot. I think the lots are

usually 30 to 35 feet; the stores are sometimes narrower. I valued

the property at that because it fronts on Main St.

Starting at the east end of Excelsior Iron Co.'s plat, which is the west line of Sec. 2, 47-27, the next property is the S. W. of the S. W. of section 2, 47-27, which is worth about \$1,000 an acre, probably, for the most valuable use to which it could be put. I will modify that, as I didn't know what was included. From the section line across the forty I would put its value at \$300 an acre; the street railroad runs across it; it is pretty well broken up. There is a large bluff on the north side and low land on the south side, and it is cut up by the tracks, and not as valuable.

The forty next west of Union park, which is the S. E. of the S. W. of 2, 47-27, I meant to value at \$1,000 an acre; the S. W. of the S. W., which is the one west of the plat there last described, I valued at \$350 an acre; the forty on which the Union park is situated is The Union park forty is not as convenient worth \$500 an acre. to Ishpeming as the forty next west, which I valued at \$1,000 an Lots on the Union park forty which might be suitable for

platting would be worth possibly \$200 each, if 75 feet front As a matter of fact, none of the property can be by 150. 1192

purchased; it is held by the mining companies.

The land in the next forty east, which is the S. E. of the S. E. of 2, 47-27, would be worth about \$100 an acre along the street railway track, north of the South Shore track. It could only be used for farming on the side hills, and not all of it for that. I did not have in mind the same forty which you had in mind. The forty next east of the Union park is pretty well broken up, and is worth \$150 an acre. Part of it might be used for farming or pasture; part of it is fair, and the other, along the line of the South Shore, is really valueless, on account of the character of the land.

The next forty, which is the N. W. of the S. W. of 1, 47-27, is ry poor land. The South Shore and C. & N. W. and L. S. & I. very poor land.

overhead crossing are on that forty.

The land in that forty where the South Shore runs through near the overhead crossing is low ground; that is right in the old Jackson

Iron Co. location.

In my judgment, the value of the land adjoining the South Shore in that forty is not \$50 an acre. It is all broken up and rocky. The road beds cut it up, and it couldn't be used for residence or farm purposes; I don't know that it could be used for any purpose. the north side of the north line it is low ground and swampy; on the south side of the south line it is rocky bluff; between the two it is all broken ground, and the roads cut it through. The C. & N. W., the L. S. & I. and the two South Shore lines come in there. I certainly think that those railroads lessened the value, and base my price on the fact that the land couldn't be used for any purpose that I know of because of the way the railroads cut it up and the character of the land itself. If the railroads were not there

and it was leveled, it might be used for some purpose,

The next forty is the S. E. of the N. W. of 1, 47-27. On the north side of the South Shore it is quite swampy, and worth about \$50 an acre. The Power House of the Marquette Traction line is on that forty, and right around it the land is fairly good. Right west of there it is very low and very swampy. There is a lake 200 or 300

yards west of the power house.

Lots 39 and 40, of Iron plat, commonly known as the Pendell plat, in the city of Negaunee, sold for \$25,000. They were the Neeley lots, and had a brick building. In Negaunee, it is very difficult to buy lots of any kind for residence purposes. The property which is for sale for residence purposes is comparatively limited, unless you go outside of the now platted portions. There is very considerable demand for residence property there, and the town is growing rapidly. Three new shafts are being sunk, and it is expected that when they are opened they will employ a considerable number of men. It will then be difficult to get residence lots, unless they plat some more.

Because of the supposition that ore underlies the valley east and south of Negaunee, it is very difficult to buy land for platting purposes. I know Maitland Add. to the city of Negaunee, and should judge that lots were selling from \$1,000 to \$1,500 each. Ann St. lies directly south of the new line of the South Shore; I put the lots that

front on Ann St. at \$800 each.

The property of the South Shore between Peninsula St. produced north, and Cyr St. in Negaunee is in more of a residence portion than business portion. Between Silver St. and Gold St., it is in the business part of town north of the track, but not south of the track. The business buildings abut on the South Shore between

Silver and Gold Sts. on the north side.

That is also true on the north side between Gold and Cyr Sts. On the south side, the property is not for sale at all; it is held by the Cleveland Cliffs Iron Co. I valued the lots that are put on Ann St., south of the track, at \$800 a lot, but don't want to value the land along the road from Pioneer Ave. east to Healy Ave., because I don't know what they could be used for.

From Cyr St. west to the end of the Jackson Iron Co.'s plat, beginning at the crossing of the South Shore and C. & N. W., I valued the

lots at \$300 each, for 50 by 125 feet.

COOLEY.

Redirect examination.

By Mr. Wykes:

In the course of my cross examination, when I was asked about, and answered with reference to, the fact that certain descriptions or areas were cut by the railroad, I meant that the presence of the railroad cutting through a description would, if the railroad stayed there, prevent the use of the entire description, together, either for platting or anything of that kind.

1195

On June 2, 1914.

MELVILLE W. THOMPSON, a witness called by defendants.

Direct examination.

By Mr. Wykes:

I am 41 years of age. I am a specialist in railroad litigation, involving accounts and engineering; business address 111 Broadway, New York; formerly of Michigan. I am by profession an engineer, a certified public accountant, bearing commission from the State of Michigan, and a member of the Michigan bar; a member of the Michigan and American Societies of Certified Public Accountants, and of the American Economic Association. My professional work was preceded by about fifteen years' business experience; of which, three years bank clerk, and twelve years officer of, or partner in, manufacturing concerns.

My attention has been exclusively devoted to special professional work, in railway accounting and engineering, during the past ten years, the first five years of which, was in the service of Michigan, in the State's railway litigation, and the last five in private practice in New York City, in litigated railway cases and in examinations for financial people. The latter period also includes engagements by the Attorney General's department of Michigan totaling about one year's time; and between the two periods I was in the employ of

the Interstate Commerce Commission.

The principal cases on which I have been employed by the State of Michigan are: Railroads vs. Auditor General (Michigan Ad Valorem Railroad Tax cases), Michigan Central vs. State of Michigan (Michigan Central Charter case), Attorney General vs. Michigan Central (Michigan Central Delinquent Tax case), and the present

1196 I was employed by State and City of New York in the Third Avenue Franchise Tax case, re franchise values, and

depreciation.

I was special assistant to its Statistician and Accountant at the time when the Commission was formulating the present classifications of railway accounts under that amendment of the Interstate Commerce Act known as the Hepburn Bill, participating in all the work on the classifications of revenue, construction and operating expense accounts, and giving special attention to depreciation accounting, and accounts for outside operations.

My principal quasi-public cases in private practice in New York

City were:

Central of Georgia Income Bond cases, a series of cases in which I was employed by the income bondholders to determine the true income of the railroad applicable to the payment of interest under its income bond mortgages.

Read et al. vs. Lehigh, in which I was, and now am, employed by the Stockholders Protective Committee of the Lehigh & New York Railway, a subsidiary of the Lehigh Valley, to determine the proper distribution of revenues and expenses between the parent road and

the subsidiary.

Appraisal of L. & M. S. Ry., in which I have been retained by the principal group of minority stockholders of the Lake Shore road to determine the value of its capital stock, in connection with the proposed merger of the Lake Shore and New York Central. Engaged

in this work at the present time.

Mountain Ice Case, a rate case in which I was employed 1197 by the Lackawanna Railroad to make separation between its costs of transporting passengers and freight.

Morristown & Erie vs. D. L. & W., a case which involves pro-rates

between a trunk line and a lateral.

Syracuse and Baldwinsville vs. New York, a case which involves the determination of the capital value of a railroad's physical assets as affected by its income.

D. L. & W. vs. Kingston Coal Co., a case which involves the compensation of a coal mining company under an operating con-

Report on the B. R. & P. R. R. Co., its value, its distribution of expenditures between operating expenses and betterments, its. strategic situation in respect of coal traffic, and the value of controlled coal mines.

Report on the operating efficiency of the Lackawanna Railroad; subsequently employed to devise, and to superintend the introduction of, improved operating methods in its motive power department

and repair shops.

Appraisal of the stock of the American Refrigerator Transit Company, a private car line controlled by the Missouri Pacific, Iron Mountain and Wabash railroads.

I. C. C. Express Rate cases, re cost of express service.

A number of other litigated cases and financial and engineering examinations.

I may add that as my business in New York has grown I 1198 have built up an efficient organization of accounting and engineering assistants, experts in their several departments, a number of whom have been employed in extracting and assembling the details and compiling the figures presented by me in this case.

I was employed by the State for the purpose of investigating certain accounts of the D. S. S. & A., and of making certain assignments of certain of the expenses, and Defts.' Ex. 72 is the result of my work. It contains complete ratios and complete assignments and the final summary of my figures. The subject matter of pages 4 to 15 is a general description of the problem of attack, and of some of the principles directed toward its solution; also, in this portion of the Exhibit there is briefly discussed some of the methods which I considered to be fallacious that have been attempted to be applied by others to this or similar problems. Pages 17 to 25, both inclusive, contain an index of pages 26 to 43, both inclusive, the latter pages setting forth an explanation of the mode of determination of the several ratios of assignment used in deriving proportions of common accounts of expenses which should be attributed to passenger or to freight, or to various components of passenger. That is, on pages 15 to 26 appears a statement of the ratios, and on pages 26 to 43, the details pertaining to those ratios. All of the various figures, etc., from which the ratios are derived are not set forth on these pages. I have compiled those in detail.

Pages 44a to 44c set forth a chart, or key, which makes clear in respect to each of the 116 operating expense accounts the several ratios, by number, which are used in assigning the common expenses applicable to such account, individually. To ratios

1199 which I determined, I gave a number, and pages 44a to 44c classify the application of those ratios to the different primary accounts. Upon pages 45 to 54 inclusive is set forth a tabulation, in semi-descriptive form, of the plan of my computation relating to each of the primary operating expense accounts, in detail, seriatum, an explanation in respect to each individual acount; the steps

passed through to obtain final results.

On pages 54a to 55 is set forth a schedule of the five general accounts of operating expenses and the 116 primary accounts respectively subordinate thereto, by name. On pages 57 to 152 is set forth the actual computation by which there is distributed between the several components of the accounts those portions thereof which in my opinion should be assigned to the classifications which I have made of the expenses; that is to say, on these pages, account by account, is set forth the computation assigning common expenses to Michigan passenger, and the further subdivision of the passengers and baggage expenses to the interstate and intrastate, etc. Pages 154 to 161, are a summarization of the results.

Referring to page 45 of Defts.' Ex. 72, the table there represents my judgment as to the proper method of dividing the several expenses, described, between Michigan passenger and freight, in view of the material available to me. Taking into account the method in which the company kept its accounts, it is my judgment that this is a proper method. As to the division of Michigan passenger common expenses between passengers and baggage, mail and express and sleepers and diners, the method expressed in the table beginning on page 45 is my judgment of a proper method, and the same is true as to the division of passengers and baggage

1200 between interstate and intrastate.

When you ask me if this represents my judgment, and I say "yes", I mean it represents my judgment in view of the material available from the company's records. I do not say that, if I began at the beginning and went over a course of several years, having control of their accounting, I could not create more perfect records of the company's books, which would avail me to exercise my judgment to better advantage.

The first column sets forth the names of the accounts, with certain sub-primary subdivisions of the primary accounts. The second column, headed "Michigan Passenger," sets forth the method by which was determined the amount of each account attributable to the cost of carrying all passengers in Michigan. The third column headed "Michigan Passenger subdivided to Passengers and Baggage, Mail

and Express, Sleepers and Diners," sets forth the method by which the expense attributable to the cost of carriage of all passengers in Michigan has been distributed to passengers and baggage, to mail and express and to sleepers and diners. The fourth column headed "Passengers and Baggage to Interstate and Intrastate," sets forth the method by which the item "Passengers and Baggage," in the third column, was subdivided between interstate travel in the state, and intrastate passengers in the state.

Under the Maintenance of Way and Structures, Superintendence is divided between Michigan passenger and freight, on the results of the computation made in respect of the activities represented by the several accounts to which the superintendence was directed. These

results are expressed in accounts 2 to 17 inclusive, and 22. I
1201 passed account 1, Superintendence, and obtained results from
accounts 2 to 17 and 22. Then, having obtained results for
the accounts last mentioned, I obtained the proportion that the
several totals of their components bore to one another, and applied
those proportions to account 1, Superintendence. The details for
that division are on page 57. Supporting details are on pages 58 and
58b; further supporting details on pages 59 to 83 and 85. The primary details on which those figures are supported are set forth in an
appendix, showing derivation from the company's records. That appendix is not part of Defts.' Ex. 72.

The method of division of account 1, Superintendence, between

The method of division of account 1, Superintendence, between passengers and baggage, mail and express and sleepers and diners is the same as described for the division between freight and passenger. The division of the same item, between interstate and intrastate passengers, was made upon the ratio of the passenger mileage interstate

and intrastate in Michigan, which is my Ratio 10.

In respect to account 2, Ballast, page 45, I found that the amount allocated to Michigan by the company for the fiscal year 1912, to which year allof mycomputations are directed, was excessive, relatively, to the amounts charged for the five years including and ending with 1912, and I computed an average for the five years past and used that average as the proper figure for 1912. Such average I subdivided between first, tracks exclusively devoted to passenger service, second, tracks exclusively freight, and third, tracks used by the passenger and freight services in common, my computation to obtain such results being upon my Ratio 2, equated tracks miles, Michigan, subdivided between passenger, freight and common, as set forth

1202 on page 28. I then divided the common expenses between passenger and freight on the basis of the gross ton miles respectively attributable to each, according to my Ratio 1, set forth and explained on pages 26, and 26a. In describing my computations, I confine myself to Michigan as to steps which succeeded the

allocation of costs to Michigan.

Having obtained the total passenger expenses, I subdivided it into three groups, passengers and baggage, mail and express and sleepers and diners, upon the basis of the gross ton mileages respectively attributable to these three sorts of service, upon my Ratio 1a, set forth and described on page 27. Having obtained the sum at-

tributable to passengers and baggage in Michigan, I subdivided it between interstate and intrastate passengers in Michigan on my

Ratio 10, set forth on page 36.

Having obtained my final results I carried them to the summary at pages 153 to 161, in which all of my final results are summarized. In all divisions of passengers and baggage between interstate and intrastate, I applied Ratio 10, with the exceptions of accounts 54, Outside Agencies, 55, Advertising, 106, Salaries and Expenses of General Officers, 107, Salaries and Expenses of Clerks and Attendants, 108, General Office Supplies and Expenses, 109, Law Expenses, 113, Stationery and Printing, 114, Other expenses.

With reference to Ballast, I refer to Ratio 2, equated track miles, Michigan. This is subdivided between passenger exclusive, freight exclusive, and common. My method of determining this ratio was as follows: The main tracks in Michigan, being main line and

branches, traffic spurs was classified as passenger and freight common, and freight. The freight was further subdivided into merchandise and ore. The second track was designated as main track, passenger and freight common. The sidings were classified into passenger exclusive, freight exclusive, and passenger and freight common, and the freight sidings were classified into merchandise and ore. The mileage of each class was taken from the Riggs appraisal. Changes in mileage during the fiscal year 1912 were ascertained and one-half of the net increase added to Riggs' figures. The mileages of the main and of side tracks were then equated on the basis that one mile of main line is equivalent to three miles of side track. Having obtained the totals of the several classes, in terms of mileage, by the method explained, the proportion existing between them as expressed in terms of percentage; i. e., treating the total as 100 per cent. found that tracks used in the passenger service exclusively amounted to .09% of the whole, tracks used exclusively in freight to 13.32% and in common passenger and freight to 86,59%.

The purpose of Ratio 2 was to ascertain the track mileage in Michigan and the use to which the track mileage was devoted, in order that certain expenses might be assigned against the classes of traffic to which they should be charged. The purpose was in part to facilitate the setting off to exclusively-used track the expenses apper-

taining to that track.

I set forth a general description of Ratio 1, on pages 26 to 26a which will explain the general method of determining this 1204 ratio. The purpose of determining the ratio was to discover

the proportions in which expenses of maintenance due to mechanical wear should be apportioned between the classes of traffic to which such wear was attributable. In my description of Ratio 1 on page 26, the term "tare weight," is the weight of the car with no load. The term "live weight," or "live load," means the load carried in the car. The passenger train load was assumed as ten tons, meaning the total weight of the passengers, baggage, mail and express matter carried on a passenger train. I estimated that the average weight would not exceed ten tons, and think that a safe estimate. Ten tons is more than the actual average weight, and would tend to increase the pas-

senger percentage and the charge against the cost of carrying an in-

trastate passenger.

I applied the gross ton mileage ratio to Ballast, because in my opinion the renewing of ballast is attributable in greater part to mechanical wear by the passage of trains than to any other agency, as the effect of time, in the sense of weather stress, causing erosion. I have in each of my several computations taken as the determining factor which decided me in the use of one ratio as against another, e. g., the gross ton mileage ratio, which reflects mechanical wear, in contradistinction from the time ratio, which affects decay attributable to the passage of time. Thus, while I recognize that a portion of the cost of replacing ballast follows erosion due to the elements, I consider that the cost of replacement is in far the greater part attributable to the mechanical wear caused by the trains. Therefore, following my plan, I have in each case taken the principle proximate cause and made my computations on the basis of that controlling element.

The ratio of mechanical wear as between passenger and freight 1205 and the ratio of time use of tracks are so nearly alike that the use of either in place of the other for any portion of one of the accounts, would not produce a material difference in the final

result.

Ratio 1 subdivides between passenger and freight, and Ratios 1a and 1b subdivide passenger into passengers and baggage, mail and express and sleepers and diners. Ratio 1a contemplates all trains on the plaintiff's tracks, whereas Ratio's 1b does not take into cognizance trains of other companies on plaintiff's tracks, but does include plaintiff's trains on the Mineral Range July, August and September, 1911. Those variations were made for application to different items of expense.

The method of obtaining Ratios 1a and 1b are set forth, on pages 27 and 27a, in sufficient detail to be understood. The purpose of these ratios was to determine what share of expenses attributable to passenger trains should respectively be assigned against passengers, and their baggage, on the one hand, and against mail and express and

sleepers and diners.

I do not regard the cost of haulage of mail and express or sleepers and diners as any component part of the cost of transporting intrastate passengers with respect to a given statutory rate of fare applying

to the latter.

The method applied to the division of the items, Ties, Rails, and Other Track Material, Under Maintenance of Way and Structures, is the same as that described for Ballast. My judgment is that 1206 the predominant cause of the expenditure is the mechanical

wear. I apply the gross ton mile ratio to the division of those expenses which result from mechanical wear because it is my opinion that the destruction of track structure is a function of the gross ton mileage passing over the track; that is to say, the weight of the trains is the main determining factor causing injuries to the track which require repairs and consequent expenses expressed in these accounts. The wear varies with the gross ton mileage, though not exactly. I think the wear due to freight trains is greater in proportion to the ton

mileage thereof than that attributable to passenger trains in proportion to their ton mileage. I have not weighted my ratio by any factor expressing such variance, but have taken what I believe to be a minimum. If I had weighted my ratio according to what I have just said, I would have thrown an increased amount of expense against freight and a decreased amount against passenger. Ratio 4, time, is described on page 31, Defts.' Ex. 72; its purpose was to determine the proper distributions between passenger and freight of those costs which run to time and are not effected by mechanical wear. In respect to costs that are effected by mechanical wear, it is my opinion that they should be charged against the service producing the wear, but in respect to costs not effected by mechanical wear it is my judgment that they should be assigned against the several traffics in the proportion of the time through which these traffics avail of the facilities afforded.

The time ratio expresses that as between passenger and freight.

Time ratio 3 expresses the like in respect to subdivisions of passenger
between passengers and baggage, mail and express and

1207 sleepers and diners. When I say "passengers and baggage,"

I pluralize the "passenger" and mean the intrastate and inter-

state passengers, not in sleeping cars, in Michigan.

I have applied this time ratio, in general, to all expenditures which are the result of time and the elements and deterioration due thereto. Where I considered the majority of the number of dollars expressed in the account to be so attributed, I applied the time ratio to the total I reduced these different elements to ratios, in some cases because the company's records were insufficient (notwithstanding the fact that they might have been made sufficiently precise to avoid the necessity of computation by percentage assignment), but in other cases because the costs in question are not of a sort that can be reduced to precisely itemized accounts and require to be assigned between different services by methods of computation. What I mean by that is that respective wear of rail heads, for instance, caused by freight and passenger trains cannot be carried in the accounts item by item for the train, for each rail, and therefore has to be determined in a scientific manner by engineers and accountants and computed as between the respective services.

In getting at my time ratio, I computed the delays caused to freight trains by passenger trains and obtained the percentage thereof to the elapsed time of the freight trains between terminals, and I found that the delay so caused was 2.75 per cent of the whole time of the freight train, and I decreased the freight train time of occupancy accordingly. I did this for all of the trains on a series of repre-

sentative dates to obtain from a series of dates results that
1208 would be approximately the same as would be obtained by a
computation for the whole year. I took seven days, 15 days
apart, namely, March 30th, April 15th, April 30th, May 15th, May
30th, June 15th, and June 30th, all in 1912, which I thought sufficiently representative.

The figures in Defts.' Ex. 72 are all for the fiscal year July 1st,

1911, to June 30th, 1912.

Ratio 3, by which I divided certain expenses under Roadway and Track, and similar items between passengers and baggage, mail and express and sleepers and diners, was applied for the same reason as expressed regarding Ratio 1a. My reason for applying Ratio 3 to certain cases instead of Ratio 1a is that Ratio 3 applies to elements which proceed with the passage of time, whereas Ratio 1a applies to elements which proceed with mechanical wear, and the application of that ratio proceeds upon the basis that the amount of time occupancy of a car used in carrying express, or baggage, or mail, is the equivalent of the car carrying passengers. In my judgment, it is a proper cost accounting to so divide such expenses.

In item 7, under Maintenance of Way and Structures, Removal of Snow, Sand and Ice, I divided the common expenses between Michigan passenger and freight on the basis of Ratio 4, based on time of Before applying Ratio 4, I applied Ratio 2a. Ratio 2a is one of my equated track mile ratios; it is similar to my basic track mile ratio 2, but different in that exclusive ore tracks are excepted in Ratio 2a and I applied Ratio 2a to the equating of track mileage in respect of

the removal of snow, sand and ice, because an investigation of that account indicated that but a small amount is charged to

months of ore business.

In Account 7, Bridges, Trestles and Culverts, I divided common expenses on Ratio 4, expressing time-use as the expenses of their maintenance in the main run with time, and not mechanical wear.

Under Michigan passenger, for that item, I adopted the company's own allocation; in fact, with very few exceptions, I adopted all the company's allocations of expenses to geographical localities or to distinct services. For accounts 11 to 14 inclusive, the plan of assignment, as stated by me on pages 45 and 46, expresses what I did

and what I regard as proper.

Item 16, Buildings, Fixtures and Grounds, is subdivided by the company into several primary and sub-primary accounts, as set forth on page 76. We assigned the common items attributable to each of those several divisions on bases we thought appropriate to the several cases; thus, sub-division A, Shops and Storehouses, being maintenance of the railroad's repair shops, in which the equipment is repaired, and storehouses, in which supplies are carried, we subdivided on the same basis as account 24, Superintendence under Maintenance of Equipment.

The reason was, we considered the use of the shops and storehouses would substantially follow the superintendence, applied to

operations conducted therein,

The sub-account Roundhouses and Turntables we subdivided between passenger outside and within Michigan on the basis of the total of our subdivision of accounts 72 and 81, Enginehouse

Expenses, Yard and Road, it being our opinion that this form is a suitable basis of distribution of the expenses. Having obtained, thereby, costs attributable to Michigan passengers, they were subdivided between passengers and baggage and mail and express on Ratio 1a, which in our opinion was a suitable ratio for application at this point.

The next item, sub-account C, is station buildings and grounds. The common expenses were distributed between passenger and freight on the basis of occupancy of the buildings, as determined by an analysis of the station payroll, Ratio 17, page 43. The next subdivision of account 16, being sub-primary account B, Section, Hand Car and Other Houses. The Michigan total was distributed against passenger, freight and common on equated track mileage, The common expense thereby determined was distributed to passenger and freight on gross ton miles, Ratio 1, as, in my openion, the expenses attendant upon the section houses, etc., followed the principal division of the expenses in respect of the track laborers, which followed the wear on the track. We then subdivided between passengers and baggage, mail and express and sleepers and diners on gross ton miles, Ratio 1a.

Subdivisions E, Coal Sheds and Trestles, and F, Water Tanks and Pump Houses, I distributed on the same basis as accounts 73 and 82, Fuel for Yard and Road Locomotives, my reason being that coal sheds and trestles handle coal consumed in the several services, and should follow like distribution. Water tanks and pump houses supply water which is evaporated upon the burning of the coal, and

should follow like distribution. The next subdivision on account 16 is sub-primary account G. Track Scales. all attributed to freight. Sub-primary account H. Fixtures, I have distributed in the same proportion as the total results of my

distribution of sub-accounts A, B, C, D, E, F and G.

Account 17, includes charges against the Marquette ore and merchandise Docks, which are exclusively freight, and assignable thereto, The remainder of account 17 is St. Ignace, merchandise and slip This is mostly freight, and entirely incident to the Mackinaw Transp. Co., under outside operations, and no part is chargeable to intrastate passenger.

I distributed accounts 18 to 22 inclusive in the same manner as Superintendence, already explained. These accounts are of a general nature, and the same principles that apply to the distribution of superintendence expense apply. They should follow the distribution of the charges for the work done to which they were incident.

Account 23 is a credit to, or reduction of, accounts 2 to 16, and I apply the credits in the same proportion in which I applied the

charges against those accounts.

Item 24, Superintendence, Maintenance of Equipment, divided on the basis of the results for accounts 25, 31, 34 and 43, being Locomotives-Repairs, Passenger-train Cars-Repairs, Freight-train Cars-Repairs, and Work Equipment-Repairs, and of the account for sleeping, dining and special car repairs included in outside operations. Item 25, Steam Locomotives—Repairs: Ratio 13, set forth on page 39 of Defts.' Ex. 72, was arrived at from an actual inspection of the time books of the switching and

locomotive men for the entire year. Ratio 13 subdivides the total switching service in Michigan, into passenger and freight, and, Ratio 13d subdivides in Michigan and extra Michigan

the total system switching.

Ratio 14, applied in the division of item 27, is revenue passenger locomotive miles of the system, subdivided between Michigan and extra Michigan, and is a computation based on Mr. Delf's figures.

Accounts 31, Passenger Train Car Repairs, and 33, Passengertrain Cars-Depreciation: In the subdivision of total passenger, between passengers and baggage on the one hand and mail and express on the other, we arbitrarily adopted the respective percentages of 85 per cent and 15 per cent, as, in our opinion, the repairs and depreciation to coaches and baggage cars constitute a larger proportion of the whole than do the same for mail and express cars, relatively to the proportionate mileage of the two classes. They are percentages which would show a larger amount to passengers and baggage and a smaller amount to mail and express than would be developed by the computation of the car miles of the two classes. The car mileage percentage in respect of mail and express cars would be about 20%, whereas I have taxed their operations with about 15%.

Account 61, Superintendence, under Transportation Expenses: I have taken the system total subdivided it into Michigan passenger. following that of the passengers and baggage, mail and express and sleepers and diners, and then subdivided on the ratios produced by the sum total of all allocations and distributions of all of the other accounts under Transportation Expenses, being accounts numbers

62 to 105, except 94 and 97, which are distributed on the same

basis as account 61. 1213

Continuing through my plan for subdivision of expenses, beginning with account 62 and ending with 116, I think, if those items are read in conjunction with the detailed explanations which appear on pages 114 to 143 of Defts.' Ex. 72, they are self-explana-

tory.

Pages 30 and 31, Ratios 3a and 3b, are variants of Ratio 3. Ratio 3 subdivides passenger train car miles in Michigan, on D. S. S. & A. tracks only, into the three groups, passengers and baggage, mail and express and sleepers and diners, and is intended to base its distribution on the factor of time of use of the tracks by the several constituents of the trains.

Pages 4 to 15 inclusive of Defts.' Ex. 72, which I in general described this morning, was prepared by me. It represents a short

statement of my views.

On page 159, Defts.' Ex. 72, the first entry in figures is to be read as follows: Operating expenses attributable to intra Michigan passenger traffic, 1912, total \$209,422, that being the amount which in my opinion should be attributable to such expenses.

The amounts stated at the foot of the recapitulation on page 158, under the columns "Sleepers and Diners," "Mail and Express" and "Passengers and Baggage," express my judgment of the cost of doing those several classes of business in Michigan.

The amount \$534,799, under "Michigan Passenger," is the amount that I arrived at as the Michigan passenger expense, meaning thereby the total passenger expense in Michigan of all classes, 1214 including therein intrastate and interstate passengers.

figures in the recapitulation include the assignments which I have made and the allocations of the company which I have adopted.

The workk was done by me and a staff of my employes. The principles upon which the work should be done were established by me, following conferences with my men and following examinations into the records, for the purpose of determining the extent of perfection or imperfection thereof. The actual extraction from the company's records of figures, being entered on our working papers, became a part of our records, was done by individuals in my employ and under my direction, and under the immediate direction of one of

my engineers, in charge.

The figures appearing in Defts.' Ex. 72, offered in evidence, are immediately derived in all cases either from exhibits placed in evidence by the plaintiff in this case or from figures appearing upon the compilations from the company's records. They can be traced back either to the plaintiff's exhibits or to the supporting figures in my own compilations, and through the latter to the company's The starting figures used, are in all cases based on the company's records. The computations therefrom are based upon the company's records, but are worked out according to principles which I approved or constructed. The aggregate of each of these items of account which I have subdivided are the same as the aggregate furnished in Mr. Delf's exhibit for the same period. In respect of the account Ballast, instead of taking Mr. Delf's figures for 1912 alone, I took the average for five years. I eliminated from the account General Expenses the directly-charged expenses attributable to this case.

The elimination of the St. Ignace docks and wharves ex-

pense I have already mentioned.

I considered the propriety of the use of the revenue train mileage basis for the purpose of dividing common expenses between passenger and freight. I think it is not a proper basis. My reasons in general are because the train mileage basis is a single measure applied to a complex set of circumstances, and this fact alone is sufficient to

condemn its use.

In connection with what I have just said, I may say further, Mr. A. Hamilton Church in his book entitled "Production Factors in Cost Accounting and Works Management," which presents an elaborate explanation of the author's views as to the methods of apportioning indirect expenses, at page 172, he expresses himself in language which I desire to adopt as expressing my views in respect to the question I am now answering. He says, referring to his analysis, "It will probably be objected that this is a very complex and formidable way of presenting costs." He then goes on to say, in respect of so-called simple methods of attaining the desired end: "The answer is that in actual practice it (the detailed method) is not as difficult as it looks, but a still more complete reply to the objections is that no method that fails to provide the information in this detailed form is anything more than a sham. No facts that are in themselves complex can be represented in fewer elements than they naturally possess. While it is not denied that they yield no good results, it must still be recognized that there is a minimum of

possible simplicity that cannot be reduced without destroying the value of the whole fabric."

The same author uses somewhat similar language in his book entitled "Expense Burden," at page 114, which I also adopt as expressing my views on this subject: "A few final observations may be offered on the subject of works accounting generally. Modern methods have taken their rise in the growing complexity of modern industry. They, like the industry itself, tend to become more complicated in proportion as the numbers of their factors increase. The snare of the simple system must therefore be avoided.

* * * And just as the whole science of navigation hinges on higher mathematics, so the management of a considerable business turns upon intricate principles which are the horror of the rule-of-thumb men and sheet anchor of the progressive men of business." In final answer I say that in my opinion the use of the train mileage basis is a generalization not applicable to the facts here, and it does not produce a result which approximates the truth.

The truth of the results produced by the train mileage basis, or the degree with which the results of that basis would approximate the truth, would vary with the train loads, and with train constituents and with weights, the number of wheels and wheel impacts, and all of those various items, and with a cumulative condition of such cir-

cumstances it would vary greatly.

It is my opinion that the two classes of train miles (freight as compared with passenger) are not similar in cost or expense to produce, and I am of the unqualified opinion that, on the average, the freight train miles on this road are more expensive to produce than

are the passenger train miles.

In my judgment, the greater speed in the passenger service has more tendency toward the effect of making the passenger train mile cost greater, but it is not sufficient to offset greater
freight cost due to certain elements; nor is it sufficient, when taken
in connection with the other elements which might fairly be placed
on the same side of the scales, to offset the elements which belong

on the freight side.

In my judgment, and directing my reply to track structure of the plaintiff's road in the condition in which it is maintained for the freight service as well as for the passenger, variations in speed of passenger trains below 30 miles an hour do not produce a sensible variation or augmentation of injury to the track. I think that at speeds exceeding 40 miles per hour the damage to the tracks becomes sensi-At a speed above 40 miles an hour the damage to bly augmented. tracks produced by the element of speed, and described by engineers as due to the dynamic augment of the static load of the train, begins to increase noticeably, and increases very materially at high speed, say, speeds 60, 70, 80 or 90 miles an hour, but those speeds are not made on this railroad, with rare exceptions in the case of 60 miles, for short distances. Between 30 and 40 mile speeds, there exists an intermediate condition; in some instances there might be an appreciable difference in the injury to the tracks between 30 and 40 mile speed and in other intsances not. depending upon the condition of the equipment and the condition of maintenance of the tracks at different seasons of the year or on different stretches of the road. The average speed of passenger trains is about 27 miles an hour, and freight about 16 miles an hour. Those are the result of computations I have had made, and they refer to the

18 actual speed per hour when the trains are moving.

On this subject, I have caused the Library of the American Association of Engineers, in New York, and other libraries to be carefully searched and all discoverable information on these subjects extracted and furnished to me, I have caused the subject to be analyzed mathematically, I have discussed the subject personally with, and obtained all the information that I could from, a number of engineers who have devoted themselves to the subject of maintenance of way and to the strength and destruction of track structures, and I have come to my conclusion as the result of my own analysis from all of the information on the subject that I have been able to gain through these sources.

Q. Now another one of the elements which appears in the testimony in this case as causing the passenger mile to be more expensive is that greater refinements of track are necessary to meet the needs of the passenger service, in that the roadway and rails must be

kept more smooth.

A. The point would be well taken if this were a road running fancy trains at high speeds, like the Lake Shore, but it doesn't run such trains. I think the point is notwell taken on this road, given the speeds at which it does run its passeger trains; i. e., I think the necessary refinements of track required to prevent the freight traffic from being unreasonably destructive to the track are sufficient to provide for the requirements of passenger trains running at the speeds of the passenger trains on this road, which, as I have stated, average 27 miles an hour and exceed 40 miles an hour in comparatively few instances, and then only on short stretches of track.

1219 The Master: Would you say, then, that if there were no passenger service on this road, the road would have to be kept in as good condition as it is now, merely for the freight service?

A. I think substantially so; if not exactly, then very nearly so. It is the opinion of practical maintenance men whom I have consulted that up to passenger speeds of 40 miles an hour the condition necessary for the maintenance of the freight service is sufficient for passenger service.

Q. Another element claimed to make the passenger train mile more expensive is the super-elevation of the outer rail at curves to meet the needs of the passenger service, the elevation being claimed to be too high for the necessities of the freight service and so high as to cause extra damage to the curve and track by the freight train; what

can you say as to that point?

A. I think the point is raised on theoretical, rather than on practical, grounds. It is manifestly true that where the outer rail is elevated for passenger speeds, and the freight trains run around the same curves at lower speeds, the freight trains tend to ride more heavily on the inner rail than on the outer rail. This riding on the inner rail manifests itself mainly in the imposition of greater weight upon the top surface of the head of the rail, which tends to cold roll the rail, and harden it, rather than to wear it. The fact is that the

greater wear of the rails on curves on this railroad is to be found on the outer rails, not on the inner rails, this wear appearing particularly at the inside edge or side of the head of the outer rail, due to

flange cutting; this is caused by the tendency of the wheels and trucks to continue on the tangent rather than to follow the curve, commonly referred to as the "nosing" of the rail. The wear of the rails on curves, relatively to the wear of the rails on tangents, will average about as follows, namely, that the wear on outer rail on the curve will be about 20 per cent, and the inner rail five per cent, above the wear on the tangents, being a ratio of four to one of wear on the outer rail as against the wear on the inner rail.

Q. Would the elevation of the outer rail, be the cause of greater wear of that rail by freight trains, or would the wear be equal if there

were no elevation?

A. If there were no elevation, the wear would be greater on the outer rail because of the tendency of the moving body to continue in a straight line. The car wheels are immovably attached to their axles and as the train passes around a curve the outer wheels travel over a greater distance than the inner wheels. The result is that one set of wheels or the other slips on the rails, and those wheels slip in respect of which there is the least resistance. The tendency, in the way the tracks are constructed, is for the wheels to slip on the outer rail, and to grind off the upper surface of the head of the rail and wear on the same caused by slippage, as contradistinguished from the flange wear on the inner edge of the head of the outer rail caused by nosing.

The curve causes the slipping; the elevation has nothing to do with the fact that slipping must take place; the slipping might be transferred from the outer rail to the inner rail, if the outer rail were

depressed.

1221 It is generally considered better practice to elevate the rail for the maximum service. The elevation of the rail simply restores on the curves the level condition of the straight tracks; i. e., the two rails being level on a piece of straight track, and the outer rail being elevated on a curve for a speed of 60 miles, the effect then, as the train passes around that curve, is that the track is relatively level.

It is the practice, after the outer rail has become badly worn on the inner side of the rail head, to exchange the rails on the curve; i. e., put the outer rails on the inside and the inner rails on the outside of the curve, thereby getting the benefit of the unworn condition of the

inner rail.

Q. Another element claimed to make greater cost per train mile for passenger service is the removal of snow; it is said that the needs of the passenger traffic, and the fact or claim that the road must be kept open for passenger traffic, necessitates the putting on of snow-plows and keeping it open for the passenger service, when that would not be done for the freight service?

A. I do not agree with that. If the snow is permited to drift and pack in the cuts, the trouble and expense of removing it becomes much greater. Therefore, the economical method of removing the snow is to get busy with the snowplows, as soon as it begins to snow, and keep the track clear. It is my judgment that the cheaper prac-

tice in respect to main tracks is to keep the snow off as it comes, and keep the road clear and open; that is the only feasible practice, and would be followed if there were no passenger trains,

if the highest economy were desired.

There is a good deal of work removing snow that requires to be done by hand, in any event, i. e., the removal of snow by shovel from the switch points and the frogs. This cost is greater in freight than in the passenger service, because of the greater number of switches devoted to freight service. It is greater also relatively to the train mileage.

Q. There is an element which has been claimed to make the passenger service more expensive, in that the trains running on a single track must pass each other; the passenger service, being preferred, the freight trains must take the siding and wait for the passenger, and that that expense should be borne by the passenger service. What

can you say as to that?

A. I think the argument is a good one; I think it is sound, and remains a question of fact; I found that on this road it is a fact. Not all the delays occur for the reason that you speak of; there are delays of a contrary nature, although much less in number. I, however, recognize the fairness of this point, and computed the amount of delay in freight trains attributable to the necessity of granting superior running rights to the passenger service. I found that this amounted to approximately 2.75% of the running time of the freight trains. The result of my general study of the subject is that I think this factor is not sufficient to offset the contrary factors (elements of greater freight cost) and thereby cause the train miles to be a suitable measure of division of common expenses.

1223 Q. Incident to the freight train taking the siding for the purpose of permitting the two trains to pass, it is claimed that there is wear on the track structure and equipment and use of fuel.

What can you say as to that?

A. This cost is a necessary incident of operating passenger and freight trains on a single track. It is manifestly necessary for one or the other of the trains to take the siding, but the costs incident upon its taking the siding are no more chargeable against the one service than the other; they should be equally apportioned between the two.

Q. It has been shown that a considerable amount of company material moves in freight trains, the exact extent of which is not shown. Are there any offsetting elements on the passenger side which would tend to equalize the cost of carrying company material

in freight trains?

A. The cost of hauling expedited shipments of company material for use in freight service and in common service, which are carried in passenger trains; furthermore, the cost of hauling employes in passenger trains, to the extent that these employes are regularly employed in freight service or in common service. Free carriage of employes not on company business is granted by the company, because by such granting of free transportation it obtains the services of such employes at lower wages than it otherwise could, which is the universal reason advanced by railroad companies in favor of the

granting of free passes to employes and in favor of the exchange of passes with other railroads for their employes. Analogous, is the transportation of employes of other companies upon official

1224 business and on pleasure trips or their personal business, and also the free transportation of certain government officials in passenger trains, the same being a charge against all classes of service; likewise the transportation of officers of ele-mosynary institutions and the hauling of private cars of officials of this or other

mondo

Q. Now, referring again to the question of speed, it has been claimed that the greater speed of passenger trains causes a greater impact on the bridges than the freight trains, and that there is a cost which is greater per passenger train mile than per freight train

mile. Is that, in your judgment, true?

A. It is my opinion that the greater impact upon bridges due to greater speeds is immaterial, in respect of bridges of longer spans than 50 feet, but that, in respect of bridges of shorter spans than 50 feet, the increased dynamic effect attributable to speed becomes material, a 10 speeds of 25 miles per hour. But, on the other hand, it is my or thou that the cumulative effect of trains composed of many units is greater than the effect in respect of shorter trains; that is to say, that the bridges are less affected by the impact of the wheels under short passenger trains than by the repeated impacts of the wheels under long freight trains, which latter not only cause a cumulative vibratory effect, but also cause an additional effect in that the repeated shocks overcome the inertia of the structure. The greatest impact is that of the locomotive; in the case of long freight trains with heavy loaded cars, there is a succession of impacts that sets up a cumulative vibratory effect.

Q. Are there, taking the other side of the proposition, certain elements or things which weight the freight side of the problem and which make the revenue freight train mile greater in

1225 cost than the passenger train mile?

A. I will state them, and having done so, I will explain those that you desire to have further elaborated:

(a) The greater tonnage of freight trains.

(b) The greater number of wheels and wheel impacts of freight trains.

(c) The greater weight, on the average, and the greater tractive force required, of locomotives of freight trains.

(d) The fact that wheels, trucks and parts are not kept in as good condition on freight trains as on passenger trains.

(e) The greater axle loading of freight train cars.

(1) The greater time through which the property is used by the

freight trains, because of their lower rate of speed.

(g) The greater wear on track, both in the straight and on curves, attributable to the fact that freight train trucks are more rigid than passenger train trucks.

(h) The fact that a greater number of derailments and injuries

to the track, ties, etc., occur in the freight service.

(i) The differences in the types of the passenger and freight loco-

motives. The principal differences in these, both of which tend on the average to increase the expenses attributable to freight traffic, are, first, the higher center of gravity of the average freight engine used on this road, which increases the rocking of the engine upon its springs and augments the dynamic impact upon the track, and second, the greater number of drivers in the freight locomotive, which produce a cumulative effect in respect of the dynamic

augments due to imperfect counterbalancing and to the in-1226

creased weight of side and main roads.

The carrying of persons free by the passenger trains in respect of employes in both classes of the service, and also in respect of employes of other roads carried on exchanges of passes, and the free transportation issued for civic and charitable reasons.

(k) The hauling of business and private cars by passenger trains.
(l) The sustaining through the passenger expenses of services not remunerative in the sleeping and dining car service.

(m) The exclusive use by the freight traffic of large amounts of mileage of line, sidetracks, and spurs not used in the passenger traffic.

(n) The greater use of yards and terminals by the freight traffic

in switching.

(o) The presence of some degree of double and triple tracking

supplied to meet the necessities of freight service. (p) The use of the main tracks by the freight service in switching operations, in greater proportion than in passenger service.

(q) The more frequent starting and stopping of freight trains

in road switching.

(r) The fact that switching done by road locomotives is not represented by road train mileage, nor until one hour is reached in each instance does such mileage appear in the switching records.

(s) The fact that expenses which would peculiarly follow the train movement, and which have been allocated, do not

follow the train mileage ratio.

(t) The expenses of the car accountant's office, which would follow the number of cars, rather than the road train mileage, and likewise the cost of inspection of cars at interchange points. Furthermore, although there are but 67 passenger cars, whereas there were 3,003 freight cars on this road, the expenses of the car accountant not only would not apply upon the ratio of the revenue train mileage but they are also greater per car for the freight cars than for the passenger cars, as the freight cars travel all over the United States, as it were, and have to be kept track of everywhere, and this is not the case in respect to the passenger cars.

(u) The greater length of passing tracks, which must be maintained to accom-odate the greater length of freight trains, because freight trains must pass freight trains as well as pass passenger trains.

(v) The greater cost of maintenance of the main line due to the frequent presence of freight switches. This also applies to common sidings from which freight tracks lead off.

(w) The greater number and the greater use of switches on freight

sidings.

(x) The greater cost of switch ties, in connection with the use of switches for freight traffic only.

(y) The higher center of gravity of freight cars, and particularly

of ore cars.

(z) The stational cost of freight movement, in the sense that freight cars are moved superfluously in the switching move-

1228 ment of other cars.

(aa) The greater damage due to track and equipment caused by the greater number of flat spots on freight car wheels than

on passenger car wheels.

(bb) The greater injury to the tracks due to the reciprocating motion of the engine, sideways, which is caused by the fact that the power is alternately applied through the cylinders on the two sides of the engine, and this element of injury varies with the tractive effort expended by the engine, and is greater at slow speeds than at high speeds.

Q. Taking all of these things which you have said weight the cost of producing the revenue freight train mile, and taking into account also the things which are said to increase the cost of producing the passenger train mile, and which you have analyzed, which in your judgment is the more expensive revenue train mile

to produce?

A. It is my opinion that the freight train revenue mile is more expensive to produce on this road than the passenger train revenue mile. I think it is considerably more than twice as expensive to produce the freight train revenue mile than the passenger train

revenue mile

The imperfections of the equipment devoted to the freight service constitute the principal cause of difference in expense, over and above the differences in the train weights. I think the element of train weights is the first main element, and that this element can then be multiplied by some of the other elements, of which the most important one in my opinion is the relative inferiority of

1229 design and of perfection of maintenance of the freight equip-

ment. There are several such differences; the car wheels in the freight service are not run with their axles as nearly parallel as are the car wheels in the passenger service; that is to say, the freight trucks get out of square, as the Master Car Builders use the term, and the effect is to injure both the tracks and the wheels. The principal effect, however, of the trucks getting out of square is a great increase in the nosing of rails. The construction or the design of the freight trucks is inferior to that of the passenger trucks.

Another element which is responsive to the question is this: The wheels under the freight cars are all chilled iron wheels, whereas the wheels under the heavy passenger cars are mainly steel-tired wheels; steel-tired wheels are turned to approximately a true round, a true circle, but chilled iron wheels cannot be turned after chilling, and they are eccentric, they are egg shaped, and vary from a true circle. One of the principal deleterious effects of this varying from a true circle is that the irregular wheels are more apt to freeze in the brakes, and to slide on the tracks. This causes what are called slid

spots, both on the tracks and on the wheels, and produce-further injuries both to tracks and to equipment. Along the same line, although not directly due to the imperfections of the wheels, are the circumstances that the system of suspension on springs is quite primitive under the freight car and is elaborated under the passenger car, and thus the shocks both against the equipment and against the rails are greater in respect of the freight equipment, and that the freight trucks do not turn as readily upon the centers as do the passenger trucks, this being due to two general causes.

at and near the king bolt is such that they revolve more readily, and the second being in the side bearings; i. e., the points where the sides of the car bear down upon the trucks when there is a list of the cars. The passenger cars usually have roller side bearings, whereas the freight cars do not, and it is of frequent occurrence that the loads in the freight cars shift and cause the freight cars to come down on the side bearings, and the result is that the freight trucks cannot swing as they otherwise would, and this increases greatly the nosing of the trucks under the freight equipment.

There are a number of items of cost in respect of which the relative costs attributable to the interstate and intrastate passengers vary, one with the other; that is to say, in some regards there are larger costs attributable to interstate passengers, relatively to passenger mileage, than to intrastate, and in others the reverse condition ob-I think that the principal element of the addition to cost of carriage of interstate passengers and intrastate passengers, both relatively to the passenger mileage, is to be found in the conditions on the Western Division of the road, where the interstate business is much greater than the intrastate business, and where the total of the passenger business is light and the expenses correspondingly large. There are factors which go to increase the expense of intrastate or interstate business respectively, but the company has no records which would permit me to work this up. I did find, in examining the company's statistical records of passenger miles, that the average length of haul of the intrastate passenger was decreased, as shown by the records, below what it actually should have been in instances where the same passengers and the same trip pays two fares;

'1231 that is treated as two passengers making two trips. I also found that the average length of passenger haul was somewhat decreased by reason of the company's performing what is substantially a suburban street car traffic between Marquette and Dead River.

There are other items of expense which are relatively different in the two services, but in respect of which there is no record, as, for instance, the relative cost of selling tickets. There are more tickets sold per passenger mile in the intrastate traffic than in the interstate traffic. These tickets are largely card tickets, although card tickets are also sold in the interstate business, particularly between points on the company's own lines. The cost of selling interline tickets is greater in some respects than the cost of selling card tickets and interline tickets tend to be sold more largely in the interstate business.

ness than do card tickets. The cost of accounting for interline business is considerably greater than for tickets for passengers on the company's own lines, alone, and these costs tend toward interstate and away from intrastate, business. There are a number of other items of this sort which are individually without great weight, and in respect of which the particulars for determining the exact facts do not exist, because in order to determine such facts an accounting of the statistical system will have to be devised in advance in such a manner as to reflect these facts, and to allow an analysis thereof.

Q. And I gain also from what you have said that you think the excess cost in interstate passenger business on the Western Division would offset any possible excess of cost in intra passenger business

on the other division.

A. I think that, in view of the expenses that have to do with more expensive car service (sleepers and diners), the 1232

item of excess would be offset.

The Master: Is it your judgment that the expense of the interstate passenger on the Western Division is greater than the expense of the intrastate passenger, based on any capitalization?

A. Yes sir. The effect of a greater volume of traffic in a particular service is to produce less cost per unit relatively to the cost

upon a smaller volume of traffic.

Q. What, in your judgment, is the proper method to be applied in dividing the commonly-used property between passenger and freight services?

A. I think that the capital division, or the division of capital invested in the property respectively against different traffics, as for instance, against passenger traffic and freight traffic, should be made upon a basis of the use of the property by the several classes of traffic, in point of time. I am speaking now of property used in common. I think the capital should be attributed to the several traffics in respect of time through which these traffics avail of the use of the common property.

THOMPSON.

Cross-examination.

By Mr. Butler:

On the subject of division of costs between passenger and freight, the Interstate Commerce Commission has no complete set of rules or regulations for the ascertainment of passenger cost; it has some rules which tend to a partial determination, being the classification

of accounts, but they do not enter upon the problem of ascer-

taining passenger cost or freight cost at all. 1233

I was employed in this case a year ago last winter, and have had charge of the accounting features of the defense in respect

to the separation between passenger and freight costs.

I gather that Henry C. Adams entertains the opinion that the cost of doing the intrastate passenger business in Michigan cannot be assigned with any reasonable degree of approximation, but I disagree with him in that. I do not entertain the view that it can be shown with certainty, particularly upon the basis of the accounts as kept by the company. I think that, were the accounts designed in advance for the purpose of making such a showing the showing would be made with substantial accuracy. The term "arithmetical accuracy" I undertsand to designate accuracy within maximü and minimi in respect of which the variation from absolute accuracy would be immaterial.

I think that, if there were no legal complications that affected definition or constructions of the components, it could be done. do not hold to the view that I can do what I have undertaken to do here with arithmetical accuracy. I think the general opinion amoung railroad accountants is that the thing cannot be done at all; mine is that it can be done with sufficient accuracy for the pur-

pose of litigation of this character.

I do not intend to imply any adverse criticism of the manner of keeping the accounts of the plaintiff. I think they are well kept in accordance with the orders of the Commission. I had full access to all the records of the company, and obtained every-

thing I asked for that they had. I never asked for the keep-1234 ing of any accounts or the installation of any system for the purposes of my work, as I did not conceive it to be within the purview of my employment to ask to have particular accounts kept.

I should think that the aggregate time spent on this case would be the equivalent of the labor of one man between two and three years, including myself. My services were particularly as an accountant, but in this particular kind of work it required what may

be called engineering accountancy also.

The density of traffic has a bearing upon cost per unit, and, in a general way, I have looked into some of these figures. I am of the opinion that the density of traffic on the South Shore road is light when compared with the St. Paul and the Northwestern, and Michigan railroads generally.

I have not looked into the traffic density; the question is too general to be answered. It bears upon the cost per unit and is a most important consideration. That is true both as to freight and passenger. The number of persons per passenger car and per passenger train on an average is important.

I think that in determining the cost of transporting intrastate passengers on this road in Michigan the density of traffic on some other road is utterly immaterial. The density of the freight traffic on the South Shore road might be material in determining the cost of the intrastate passenger business. It would depend upon where it The general effect would be that the great density of

freight business would reduce the cost of passenger business, 1235 but I am hardly prepared to testify as to universal rules.

There are some items of cost which properly should be divided between passenger and freight on the basis of relative amounts of passenger and freight business; so with the interchange item of cost, the road with the greater density of freight traffic in its cost account should assign a larger portion of this interchange item to freight than to passenger.

I ascertained the density of the freight traffic of this road, and the earnings and tons moved, and tons per mile, but I did not take the trouble to make a comparison. It was immaterial in my work

what other roads did.

I have had nothing to do with matters of earnings, but have reported solely upon matters of cost. I was not asked to determine that point, and paid no attention to it. I have made no attempt to testify to determining the earnings from any class of traffic. devoted myself solely to costs, and I did not require to know earnings to determine costs. The matter of earnings has been one of The costs are not dependent upon earnings. indifference to me.

I have discovered the general fact that the dining cars are operated I cannot tell you the figures; I do not know, and cannot approximate it from memory. I testified to a distinct loss on din-

ing cars and sleeping cars and mail and express.

I do not regard the cost of haulage of the mail or express or sleepers and diners as one of the component parts of the cost 1236 of transporting intrastate passengers. My figures are all

based on that hypothesis, and I have apportioned cost to those dining and sleeping cars. I think that should be paid for; I do not think it is included in the rate of fares, so much a mile. I have included it within the general cost of passenger business, but I laid it aside in respect of the cost of transporting intrastate passengers in Michigan in respect to a given rate of fare per mile, because I considered that it has no relation thereto. I think the people who ride in the sleepers and diners should pay for it, but not as a rate

per mile. I did not undertake to say that if this company discontinued its dining and sleeping car service it would save out of the operating expenses the whole \$112,603, or what part could be saved. I have no opinion on whether this company ought to do any such thing as that, as a business proposition. I do not know that, if it did do that, its other expenses would not greatly exceed the \$112,603, for eating houses, delayed trains, stopping for people to eat, and running in the day instead of at night. I did not indicate the view that the

company ought not to have the services of dining and sleeping cars. I should think that the sleeping car rates probably were low. think they are as high as similar rates in the vicinity. came to my attention to indicate that they were lower than they ought to be, or that the charges in dining cars were lower than they ought to be. If they abandoned the dining cars, I think they would have to stop the trains to feed the people. I intended to suggest that I think the custom of running expensive dining cars, and serving meals in imitation of expensive restaurants, is a wasteful practice in railroading, in general. As to sleeping cars, I think the rates are too low, generally, in the country.

1237 I think that the difference between transportation charges, as stated, and sleeping car charges as stated, leaves the sleeping I cannot say that the charges for the service of car charge too low. passenger trains, including the sleepers, diners and transportation, are too low generally in the country. My expression in respect to the rates of sleeping car fare was directed toward the general subject, not upon the South Shore road, and what I volunteered had to do with the general subject, and not with the South Shore.

I have endeavored to do what I was employed to do, namely, discover the cost to the plaintiff of transporting interstate and intrastate passengers in Michigan. I eliminate from that cost the cost of the

dining and sleeping car business.

I do not think I should exclude the proper portion of the dynamo cost, to light the train. If the dynamo was used in part to drive fans and for lights in all the coaches, and in part to drive the fans in the sleeper, I think it well might be subdivided between them. I think all the expenses of the sleeping cars should be charged against the people who pay for sleeper accommodations.

Q. Let us now speak generally of railroad business: Assume that, by an increase of the service, expenses would be increased a given sum, which we will say is X, but revenue would be increased twice that sum, 2 X; can you tell us on that whether or not the increased

service resulted in a profit or a loss?

A. In general, I should imply that the increased service would result in a profit. I think that the question is not as simple as it ap-

pears on its face.

1238 I find the 1912 expenses of the sleepers and diners to be \$112,603. Complt's Ex. 48a, Delf, sheet 2, shows it to be \$55,180.43. I make no attempto show whether it results in a net gain or loss. The reason for my increased cost over Delf's comes from apportioning common expenses to the sleepers and diners. If I was wrong in my assumption, that the expense of the sleepers and diners ought not to be taken into account, but in truth and fact it should be taken into account and all treated as a passenger charge, the result would be very much more favorable to the company.

By my plan of apportionment I take out of the passenger operating expenses \$112,603. If I left it in, the operating expenses of the passenger business would have been increased that much. I don't know whether or not that might control the decision in the case. I have directed my attention at finding out as nearly as I could what the cost

was, regardless of the result.

Whether or not there be precedents for this deduction I cannot say; I did not attempt to look them up. It seemed to me to be a matter of simplicity. I do not know of any accountant that ever did any such thing, and do not know of any court that ever held any such doctrine. As to whether any commission ever held any such doctrine, directly or impliedly, I remember that there was a very considerable argument in the conference between the Interstate Commerce Commission and the accountants representing the railroads in respect of the proper basis of casting up sleeping car and dining car expenses, and my recollection is that the results adopted had to do solely with the conformance by the railroads to the customs that the Pullman Company had set up for itself as a matter of convenience. As far as I know, that idea is a new idea in this problem; never before

1239 put forward in any litigation, rate hearing or controversy that I know of, and so far as I was guided in arriving at this de-

cision, I arrived at it myself.

All questions that came up in connection with this work formed a subject of discussion between myself and all of my assistants, and it

would be impossible for me to say at this date who originally suggested one or the other. I cannot tell who invented the idea. It may have been me, and it may have been some of my assistants; it was not

any of the lawyers in the case.

In arriving at the cost of Michigan intrastate passenger business, I necessarily had to examine into certain of the ore costs. I did not report on it, further than as contained in my Defts.' Ex. 72. I did not attempt to separate interstate and intrastate freight in Michigan, or between Michigan and out of Michigan. I made some attempts to examine Mr. Delf's work, but the amount of it was so great that I never was able to get all through it.

I read Mr. Adams' testimony with care; I don't know that I said I did this with approximate accuracy. I said that I did this with approximate accuracy in view of existing records; that is an entirely

different story.

I would not go beyond saying that, given such accounts as the company had as a basis for me to go on, I think my result is as near right as could be had; what I mean is, I did the best I could with the material at hand.

I did not set aside the expenses of the dining and sleeping cars on the theory that the intrastate passengers did not cat and sleep 1240 in them; I did it on the theory that they should pay for those services specifically, and not as a part of their transportation rate. It is not for me to say they should pay enough to cover the amount of expenses I have apportioned; that is a matter of company

policy.

Upon whether they ought to pay enough to pay operating expenses and a ratable portion of the profit, I haven't any opiniou. I set aside this \$112,000 because I don't think that the cost of operating sleepers and diners is a part of the service for which the passengers pay when they buy a ticket to transport them between two points. They have to pay for their food and for their sleeping besides. My idea is that it is not a proper incident to the passage.

I am trying to produce a cost account, and that is all, and I said that this was not a proper element to take into consideration in this

rate case, to test these rates.

Reading, as I have for the first time today, my testimony on that subject, I think perhaps it would be suitable for me to leave out my remarks about a given statutory rate of fare, and amend my answer to say that I do not regard the cost of haulage of mail or express or sleepers and diners as any component part of the cost of transporting passengers; that has to do with the rate per mile of passenger fare paid by them. I have not attempted to express my opinion that the service of dining cars or of sleeping cars on this road should be discontinued. If they discontinued the dining car and sleeping car in this territory; I take it, as to their passenger business as whole, that they couldn't do it. I am not expressing an opinion as to what would ruin them. I think it would be bad business.

1241 The Master: If it would, then the expense of the diners and sleepers would be a necessary part of the cost of transporting

passengers?

A. No, sir, I don't think so at all.

I suppose they have newsboys on their trains, I cannot remember any activity that the company has exerted in that respect, other than to let out a contract to a news company. I did not undertake to ascertain what proportion of the total expenses of the passenger department should be assigned to the space and weight occupied by the news agent. It might be done. That is not a proper expense to include, to ascertain the cost of hauling intrastate passenger; it should be charged against the revenue derived from the sale of news.

I hold that the diners, the sleepers, the newsboy, or the expense of maintaining these or rendering this service, ought to be excluded. As to the dynamo that furnished the fan, in the coach, I should think that the cost of that would probably go along with the cost of maintaining the springs underneath the coaches for the comfort of the passengers, and as to the plot of grass by the station at Marquette, I think that is largely a question of company taste. In such matters as cost of mowing and keeping the grass clean, I haven't attempted to east up the propriety or impropriety of the acts of the management of the company, but have taken them as I found them, and have endeavored as best I might to put them in a proper position.

Ratio 4 is a time ratio; it expresses a relation of the time that the freight trains are running to the time that the passenger trains are running. I take into account that they stop to take on and let off

passengers while en route, and compute time from terminal to
1242 terminal; that is, from the beginning to the end of the run.

That is also true as to freight trains, with the exception that,
in respect to delays of freight caused by meeting passenger trains,

that time has been taken out.

I took the total time from the beginning to the end of the run on the assumption that the amount of track respectively relegated to the use of a passenger train and of a freight train over and above the amount of track actually under the train was the same. I assumed the passenger train would occupy the space between two passing tracks, except in those instances where a passenger train leaving a passing track in advance of a freight train, it would be followed by the freight train, and I com uted out mathematically the effect of that relation and found it did not change the original assumption by any material amount, and the same as to freight. That is, it was from passing track to passing track, and that distance would vary on different parts of the line; I assume that it averaged. The length of the train or the weight of the train cuts no figure; the speed of the train does. A freight train making a hundred miles in 10 hours, which is the standard according to the wage schedule, would occupy the track or be entitled to twice the allowance in getting this ratio that the passenger train would that made the run in five hours, eliminating this allowance that I have made.

That factor (4) was used by me to apportion certain common expenses between the freight department and the passenger department; generally speaking, that class of expenses were those not caused by mechanical wear. Expenses due to mechanical wear I divided on an-

other basis defined as Ratio one. The time ratio was used to appor-

tion the weather stress items between the two departments.

I didn't group decay and obsolescence together. 1243 tion obsolescence to the two departments of service on the basis of wear. I think that in that respect my apportionment of the accounts of depreciation is subject to criticism, but such information as I had at the time when I cast up those figures led me to believe that the depreciation charge on this road reflected wear, rather than obsolescence, and I did not find it convenient to attempt to analyze into those figures and see whether it would be requisite to change the Lasis that I used in respect of the assignment of depreciation charges from wear to the time element, and the reason that decided me not to attempt that labor was that the difference in the result which would have been produced would have been immaterial, according to my figures. It happened by accident my time percentage and my wear percentage were the same, so it didn't make any difference whether I made a mistake in principle or not. I discovered after I had cast up my original figures that the company was making some replacements of equipment, apparently because of obsolescence rather than destruction by mechanical wear, and had it made any material difference in the result I should have recast the account in that respect.

I am of the opinion that the expenses due to obsolescence, including inadequacy, should be divided between the freight and passenger business on the time basis. It was wrong in principle not to apply the time basis to obsolescence and inadequacy. I want to point out that the accounts of depreciation do not make it clearly determinable what portion has to do with one or the other, so I didn't have the bases.

The result expressed in figures is that, if the freight trains on the South Shore ran faster the passenger business would cost more directly in proportion, as the speed of the freight trains was increased, the cost of the passenger department would increase. If the power of

1244 the State would compel this company to run its freight trains slower, they could thereby reduce the passenger rates more than they otherwise could; it might seem to have that effect. It perhaps might have the opposite effect elsewhere. So far as common expenses are concerned, that have to do with time ratio rather than

mechanical wear, that would be true.

For the purpose of illustrating the application of this Ratio 4, following your assumption that there was a snow storm and that \$100 was expended by the company in snowplow service to clear the main line for use of revenue trains, that a passenger train followed immediately after the track was clear and made the 100 miles in 3½ hours, and a way freight following along after it made it in ten hours, 3½ of which was standing on the main line and loading and unloading freight at various stations of way freight, this method then would charge about 35/135ths, or \$26, to the passenger train, and the balance to the freight train. It would charge as much to the freight while it was standing in front of the platforms as I charged to the whole passenger run—3½ hours. I think that is a correct cost accounting principle. So far as I know, or knew at the time, I originated that scheme, but I afterwards discovered that it had been in-

dependently originated by Prof. Friday. I think Friday invented it in his own mind at sometime unknown to me. When I told him about it he told me that he had thought of it. I was delighted to find such intelligent support. I don't think it has ever been employed in a case before, but I am satisfied that the principle is irrefragible.

We will say that on a hundred miles of road there are 10 crossings guarded by flagmen; if a passenger train ran the hundred miles in 31/2 hours and a freight train took 10 hours, that block of ex-

penses would be divided about \$26 to passenger and the rest As to these items which I divided on the time to freight. basis, neither the length, weight or consist of the train makes any difference; if the speed of the freight and passenger trains was the same, a straight train mile basis would be the same as the time ratio.

I determined the proportion of the time use of each to the sum total of the two. The sum total of the two is not the sum total of time through which the tracks might carry trains. The difference between the sum total and a possible total is waste, and I apportioned the waste on the same ratio as the actual use. I don't know how much of the time was waste and how much actual use. It cannot be ascertained from the figures I have. I thought of the matter very carefully, and I concluded that, as it was my intention to apportion the wasted time upon the same basis as the utilized time, it would be wasted labor to discover the actual or definite amount of utilized time and wasted time.

Ratio 4 expresses the relation of the time used by passenger trains of 29.12%, and freight of 70.88%, to the total time used by passenger and freight trains. Freight trains, total time of occupation for the year, 4,630,398 minutes, being 70.88% of the total; total time in minutes 6,532,075. The periods of observation are the first seven days in each of the months, July, September and November, 1911, and January, March and May, 1912. I did not make the experi-

mental determination of how much the tracks would hold.

The unit of occupation varied according to the distance of the passing tracks from each other, in individual instances; I assume that the average was the same where one train would be in a longer stretch at

one time and another time would be in a shorter stretch, or vice versa. I let it stand as it was; it made no difference. I took the elapsed time, on the assumption that they were the same; it was unnecessary to use a multiplier. I never heard of the method being used except by me. It is one of my most important ratios here.

The actual number of passenger train minutes during the 42 days in question was not 1,901,677, but was as a matter of fact 234,543. That number of minutes last stated was divided by the number of train miles corresponding to the same period, to produce an average time per passenger train mile of 2.49 minutes. average time per train mile was then multiplied into the total number of passenger train miles, giving a total of 1,901,677 miles. In respect to the freight trains, the computation was made in the same way. What I call minutes was a computed number of minutes per mile, multiplied into the total number of train miles. The number of passenger train minutes during the 43 days was 234,543. That figure, divided by the total number of minutes in 42 days, which is 60,480, gives approximately 3.85 train minutes, per elapsed minute. It is an average of four trains over all the track; the figure

is a statistical average.

I find that my sheets do not show the number of trains; they show the total number of miles of passenger trains which ran during each day on each division, and the elapsed time consumed. I did not observe trains at all; I took these figures from the dispatcher's daily report to the auditor. I made observations concerning trains moved by the date. I cannot tell you how many trains were moved on any day.

The figure, 1,901,677, is derived by the application of the total train miles of passenger trains in Michigan, D. S. S. & A. operations,

which was 723,874 train miles, to the average time of 2.49 minutes per train mile, to produce the result of 1,805,342 minutes of track occupancy, to which last mentioned figures there was added a similar figure in respect of C. & N. W. and C. M. & St. P. operations on South Shore tracks and obtained in a like manner, producing a total for the last mentioned subdivision of 96,335 minutes, which, added to the previous total, gives 1,901,677 minutes of passenger train occupation on the track. That covers a period of one year, through which 723,874 train miles of D. S. S. & A. trains were made, and 31,325 train miles of St. Paul.

I have arrived at the conclusion that the passenger train occupancy of the track in minutes was 1,901,677; if we divide that by the number of minutes in 365 days, that will give us the number of trains on an average for the year, which is slightly less than 4. This Company had only four passenger trains occupying its track in Michigan on the average each day of 24 hours in 1912. If the trains were only on the tracks half a day, there might be eight trains running 12 hours, making four trains 24 hours. Approximately 8.85 freight trains on the average per day. That is on the assumption that these 42 days represent a fair typical average of all of the time. It would be right to call the space between passing tracks the unit of occupancy. The units of occupation, or the distances between the passing tracks, vary in length. My recollection is that the average distance is, between passing tracks, about six or seven miles.

I assumed that each train, freight and passenger, occupied the same space on an average. Sometimes it may be said that trains occupy more than one stretch. On this road, the traffic is not sufficiently dense so that this suppositious case would be of great weight.

Compared with such roads as the Michigan Central, density 1248 of train movement is light. Compared with some divisions of the Pere Marquette, I should say it is not. I do not like to make a general comparison. The train movement on the South Shore is light compared with some divisions of the St. Paul, and it is not light as compared with others.

I think it is obvious that there is lots of room for more trains on the South Shore road in Michigan, but could not give you any opinion about how many the road could accom-odate. I have no doubt that it could accom-odate twice as many, but to take that proposition and continue it and say it could in turn accom-odate 3 times, 4 times, 5 times or 10 times, as many, is a proposition I am not going to attempt to answer without studying that problem itself.

I did not know how much waste time there was and did not even form an opinion as to whether there was two or ten times as much waste time. I have divided my waste time on the basis of the used I think there is but one sound view on that subject, which is universally held by cost accountants, namely, that, in respect of discovering costs in the past, it must be done, and I have done it. So far as I am aware, the subject of waste time has not been generally carefully examined into by those who have made computations of this sort. So far as I know, the problem has not come up until I, myself, brought it up. I never conferred with any accountant on the subject outside of my own force, except Mr. Friday. Mr. Friday. who worked on this case under Dr. Adams, when I stated to him my own views in respect of time use or occupancy of the tracks, stated that he, himself, had independently come to the same view before I spoke to him about it, and that it had been suggested to him by reading your (Mr. Butler's) brief in the case, page 41, in respect

of the exclusive use of the tracks by the one service or the other. He entertains the same view about dividing the waste time that I have applied here. This time ratio was never used before, so far as I know, except that there is something in the Minnesota Rate Cases, in the decision of the Supreme Court, that

might indicate that the Court had something of that sort in mind. For each \$100 of fencing that is spent, I charge the freight \$70.88; that is true for expenditures for watching crossings, bridges, work about the embankments, cuts, ditches, drains and maintenance of crossings and crossing signs, and it becomes an element in the factors used for the division of superintendence, etc., so it has much to do with my result. It would not require a great deal of research to ascertain just to what extent the use of this factor affected my This ratio of 29.12 to 70.88 represents the elapsed time, rather than speed, between terminal, of the passenger train to the freight train. It depends in part upon speed and part upon stops. It follows that, if passenger trains would go slower, their operating cost would be more. If you abandon the dining cars and stop the trains to let the passengers eat, it would not increase expenses for keeping up the fences. If the passenger trains occupied more time and went slower, stopping for the people to eat at the stations, it would thereby cost the passenger business more for keeping up fences, eleaning out ditches, putting in bridges, watchmen at crossings, superintendence, stationery, and all the other things into which this time enters as an element or a factor for division; that ratio, arrived at by comparing the time or speed of the different classes of trains, does not take into account the weight or the length of the train, except as those affect time in transit. According to this scheme, out of \$100 for fences, \$29.12 charged to the passenger business.

1250 I charge some of that to mail and express, according to Ratio 3, passenger train car miles in Michigan, and the sundry sugdivision- thereof. So of that, \$29.12, I would set aside to mail and express about 141/2% and 26.36% to sleepers and diners. Ratio 3 was intended to be the nearest approximation to a time ratio that could be had. I insisted that the apportionment between those three classes must be made on the basis of time. The mail and express car and sleepers and diners make precisely the same time over the road enroute as the rest of the passenger equipment. The ratio between different parts of the car is the ratio of the linear space of the two ends of the car, or two needs of the car, one to the other; that is a time ratio in respect of the problem under examination. It is a car mile and a space ratio, and becomes for this portion of the problem a time ratio. The car mile basis, when it comes to the division between passengers and baggage and mail and express is called by me time, and the car mile basis is the right basis for that division.

In the classification of accounts by the Interstate Commerce Commission hitherto, dining cars and sleepers have been classed as outside operations, and the South Shore has followed that classification. Assuming sheet 2 of Complt.'s Ex. 48a, Delf, to be correct under the classification during that year, operating expenses were \$55,180.43. It was only the net that was taken into account, \$1,413.48. That is, the operating expenses of the company, when stated, would not include these operations. In my work here, I have ascertained the cost of sleepers and diners at \$112,603; that should be added to the \$55,180.43. My figure has to do with the transportation and main-

tenance expenses, etc., of sleepers and diners not included in outside operations. I do not claim that if the Company did 1251 discontinue the service they could save the \$167,000 in operating expenses. Undoubtedly there would be some considerable saving, as to fuel and such things, but whether the total saving would equal the revenue shown on Delf's Exhibit, \$56,593, I cannot say. I would not expect it would amount to that much. think that, leaving things as they are, all other things being equal the company is as well off by continuing the dining car and sleeping car service as it would be if it discontinued the service. I think it would be very foolish and absurd business policy for it to discontinue the dining or sleeping car service. Undoubtedly, the competition, even in some parts of the northern peninsula, is very active. principal points served by this road in Michigan are the points in the Copper and Iron countries, and they are highly competitive to the C. & N. W. and C. M. & St. P. but they are mostly monopolistic to the South Shore. The South Shore monopolizes the business at its own end-the business that moves from Detroit, for example. The Northwestern is a pretty strong competitor to the South Shore, or the St. Paul and Michigan Central. The whole territory up there is in competitive territory, both freight and passenger respect of general competitive conditions, it is true that there is competition although the territory of the South Shore itself is in good part non-competitive.

Marquette is hardly competitive, except for steamboat traffic in summer, so far as passenger business is concerned. I should expect that freight rates are controlled by competition, and measurably, passenger rates. I think that if the company would suspend its dining and sleeping cars it would be a losing proposition.

operating expenses of steam roads prescribed by the Commission. Issue of 1914, effective July 1, 1914." The introductory letter contains this paragraph: "Accounts are provided in this classification for the revenues and expenses of operations which heretofore have been classed as auxiliary or outside operations. The purpose in merging these accounts has been to secure a statement of revenues and expenses in connection with the operation of all physical property, the cost of which is includable in the accounts for investments in road and equipment."

It is becoming quite customary in this country for railway carriers to furnish dining and sleeping car service, and it has become a usual incident of transporting persons that way. It is a necessary incident of the service, in view of the state of civilization and the

public demand.

I think the sleeping car fares are too low, generally speaking. The railroad companies should have the money, instead of the Pullman Company. What I mean, of course, is that, if the rates were raised to \$5, I did not think the increase should go to Pullman; it should come back to the railroads, for their cost of hauling the cars. I think, generally speaking, that rates of sleeping cars should be raised in this country. I have not any opinion as to the general propriety of raising or lowering passenger fares. It is only sleepers and diners that I want to express an opinion on. I agree that sleeping and dining car service is a necessary incident of the transportation of persons for hire by rail, and I express the opinion that the charges were too low. I do not think that I am competent to

answer as to whether a two cent passenger rate is too high or

1253 too low on the South Shore road.

I haven't examined into its mail and express rates. I paid no attention to revenues whatsoever. I did not separate the cost between the sleeping and the dining cars, so as to show the cost of each. I don't think that they are a necessary portion of that service which is to be given to the passenger for the fare he pays for transportation between two points. Nobody else does either. I excluded it because I think that is something that should be paid for separately and its cost should be charged against the separate payment, but I do not undertake to say, as a practical matter, that this company could make charges which would give it \$167,000 and more. That is its misfortune.

A person engaged in any large business, like a factory or a railroad, is justified in taking on an incidental business whenever the returns exceed the increased cost. That is probably a rule that is generally good. I would say that the principal business of the South-Shore road was the transportation of freight and persons for hire, and that the transportation of mail and express was in a sense incidental to it.

Q. And would you also say from your knowledge of such matters that the increased cost of hauling the express and mail matter is

very slight?

A. I hardly like to subscribe to that. People take on new units of business on the theory that it doesn't cost much more to handle, but when they get through they find it has borne its share of expenses. I do think that the mail and express business increased the cost of operation of the passenger trains of the South Shore; I don't know how much; I haven't endeavored to find those things

out. I have made no attempt to determine the increased 1254 cost due or chargeable to the mail and express business over

what the cost would be without them.

So far as the records furnished the information, I can state approximately what it does cost to haul mail and express and what proportion of the total cost is justly assignable, thereto. Assuming that the records are true, insofar as they purport to be true, my results are true, so far as the records are responsive to furnishing information required to be had. They are not directly responsive to the cost of hauling the mails at all, only upon sundry computations.

I assume, and have no reason to doubt, that the things that are marked down in Mr. Delf's records are true, but the situation is not analyzed, or the scheme of accounting is not made as I would make it, to ascertain the cost of mail or express. I don't know what I would do to have the books kept in such manner as to show the cost, but, so far as the books are responsive to digging out the truth I think I have got it approximately correct; so far as they do not afford the basis for a correct computation, to that extent my computation is in error.

I say that they may or may not be true. I further say that they are as near the truth, approximately, as can be learned from the existing records, and the existing records are the only evidence of what has happened. I also say that the existing records were not kept so as to enable anyone to ascertain the truth with precise accuracy with respect to the subject. I now say that in some regards I think my conclusions are approximately correct, and that in other items I couldn't say. I did not mean in respect of any one account;

I meant this or that stage of process. The mail and express 1255 is all carried in baggage cars. They would have to provide

space at any rate for the baggage.

I suppose, in a sense, this mail business is kind of incidental to the main business, but, since you began talking about incidental businesses, I find it rather difficult to give my assent to the notion that the railroad is run for any one particular business; I think it is run as a composite for all of the businesses—freight, passenger, express and mail.

I think there is no ratio I have used that is established with mathematical accuracy. In my scheme of apportionment, especially of maintenance of way expenses, mechanical wear expense is divided

on methods different from the expenses due to other causes. It is impossible to tell with accuracy what is due to mechanical wear, and what is due to ballast or decay. I classified according to where the majority of the dollars fell; if the majority in a single item fell to wear, I classified one way, and, if to the weather side, another way. There is a great diversity of opinion as to what proportion is weather stress and what proportion is wear; Ratio 2 is founded on the proposition that it costs three times as much to maintain one track as another. Ratio 2 is important, because it has the effect of taking out 13.32 per cent of maintenance and it is quite important to know whether that is arrived at correctly. I took the basis from an exhibit of Mr. Riggs.

 The increased cost to the company of hauling its employes free on its passenger trains over what that cost would be if they didn't haul them, I don't think is a figure susceptible of determination at present. Cost accounting might reach it, but I don't think

the figures exist here to show it. That comes under the class of things which you start in by saying "it doesn't cost any more;" finally when the facilities become more or less filled up, it

requires more facilities and does cost more.

I think that on the average the cars were less than half filled, including the help that is hauled free. I haven't investigated whether it increases expenses any substantial sum to haul its employes in its regular passenger trains free. It is not trifling with common sense to say that there is a substantial element of expense in permitting the employes to move from place to place upon the trains, any more than the similar trifling with common sense, to offset which, that element of cost was brought out be me. I am rather disposed to think that there has been a great deal of attempt to make hairs into tons. I don't think it is a humbug to claim that it costs anything to haul coal, ties, timber and supplies that are hauled on revenue freight trains, to operate and maintain the road.

Q. Did you give the reasons specified and lettered a, b, c, etc., as reasons why the total train mile cost of the revenue freight train was greater than the total train mile cost of the revenue passenger train, as the language purports, or did you mean that the proportion of common expenses of the freight was greater than of the passenger,

for the reasons enumerated?

A. I meant the proportion of common expenses, of course.

Q. I observe again this question: "Mr. Thompson, taking all of these things which you have said weigh in the cost of producing the revenue freight train mile and taking into account also the things

which are said to increase the cost of producing the passenger train mile and which you have analyzed, which in your judgment is the more expensive revenue train mile to produce?

A. It is my opinion that the freight revenue train mile is more expensive to produce on this road than the passenger train revenue mile.

Q. Have you any judgment as to how much more?

A. I think it is considerably more than twice as expensive to produce the freight train revenue mile than the passenger train revenue mile."

A. At that point I mean in respect to the division of common expenses. I was answering questions that counsel asked me, and did not then, as I sometimes do not with you, see all of the things that might bear upon it when it has been running along on a particular line.

Q. Now, if that is true, what relevancy to the subject does the reason (n) have? The reason is "The exclusive use by the freight traffic of a large amount of mileage of line sidetracks and spurs not

used in the passenger traffic."

A. The relevancy of that is that the question, as I understood it, was directed, not to my own computation, but to Mr. Delf's computation, in which he had treated as subject to a division as common expenses some things which I myself had laid aside and excluded.

Mr. Wykes: Those all appear in the common expenses.

Q. Reason l, "the sustaining through passenger expenses of services not remunerative in the sleeping and dining car service?"

A. That also was directed, as I say these questions had to do with the division on the train mile basis that had been made by Mr. Delf, in which he included as common these expenses you just mentioned.

1258 Mr. Butler: I offer in evidence the Classification of Operating Revenues and Operating Expenses of Steam Roads, prescribed by the I. C. C., effective on July 1, 1914. Marked "Complt.'s Ex. 94, Thompson."

I do not recognize that a revenue train mileage basis might be a proper basis for the division of the common maintenance expenses on other roads and in other cases. I can conceive of a case in which it would chance to bring out the same result, but that would be a mere coincidence. I think it is no measure of the fact, and is not supported by reason. I think it would produce a highly inaccurate result. I do not intend that all of these alphabetical reasons have general application to all of the items.

Q. These reasons are not alleged as reasons why you did not use train mileage on the basis you analyze this proposition, but are alleged as reasons why it was wrong to use train mileage as the com-

pany used it, is that right?

A. I think both. They are advanced as reasons why it was improper for the company to use the train mileage basis, and why it

would be improper for me to do likewise.

Q. You think it would be better, do you not, to separate the terminals from the line and divide the terminals on the best basis you could and the line on the best basis that you could?

A. I think so, yes.

Q. And that the adding of switch engine mileage to the train

miles, well, it is scarcely logical anyway is it?

1259 A. Well, I think in respect of that last point that it would tend to reduce the error which would be involved in using the line train mileage only—this switching mileage for the freight exceeds the switching mileage for the passenger almost uniformly.

Q. So then it follows, I take it, that you are of the opinion that the train mileage basis assigns too much of the maintenance expenses to passenger, and that if you would add the switching mileage it would reduce the error; that is the idea that I gather?

A. I think it is extremely rough in either case, but I think in the present case the addition of switching miles would tend to reduce

the error.

The expenses of the car accountant's office would follow the number of cars rather than the road train mileage, and likewise the cost of inspection of cars at interchange points. Furthermore, although there are but 67 passenger cars whereas there are 3,003 freight cars on this road, the expenses of the car accountant not only would not apply upon the ratio of the revenue train mileage, but they are also greater per car for the freight cars than for the passenger cars, as the freight cars travel all over the United States and have to be kept track of everywhere, and this is not the case in respect of passenger cars.

I found car accountant's expenses included within general expenses, and I subdivided general expenses upon the basis of an average of all of the previous determinations. It might not be exactly right, but the margin of error would be reduced. If I was wrong in all my previous determinations, the extent of error therein

and thereby would be increased.

When you speak of accuracy I am not quite sure, and you have apparently used the term in different ways, and I want to be sure that I get myself properly understood by this Court. When you say accuracy, if you mean absolute correctness, in terms of five dollars or one dollar or one cent, then I answer that I do not attempt such accuracy, but if you mean accuracy in respect of substantial accuracy, and a minimum degree of variation from error, then I say that my results are substantially accurate. Percentages of variation that my be included within accuracy would vary in different items. My limit is the nearest determination of the fact that can be made from the existing records. That is the best possible then. Substantial accuracy means the best possible

best possible then. Substantial accuracy means the best possible. So far as the engine alone is concerned, I think the wear on the ties increases materially at speeds exceeding 40 miles an hour; I think at speeds below 30 miles an hour the difference in speed is not material in respect of the wear. It would be a greater injury to ties and rails at a speed of 30 miles than standing still, at 30 than 20, or at 30 and 16, or 27 and 16. I want you to let me get through with that; I consider that the difference between the injuries at zero speed and at some low speed immediately above is not great. There is wear due to movement, and speed affects the wear; wear of some sort is greater when the speed is greater than when the speed is less. I think that the total wear is greater at high speeds than at low speeds; I think it greater at 40 than at 16 miles per hour. I think, all other things being equal, wear at 27 miles would be somewhat greater than at 16; perhaps 15%.

The passage of a train over a track produces impact, because of the necessary imperfections in the track and in the equipment. That impact is not measured by the square of the speed multiplied by the weight. A moving train has momentum, and the 1261 extent of that momentum is weight by speed; a moving train imposes impact, and that impact is measured by weight by the square of the speed, but it is not the whole weight of the train which is multiplied by the square of the speed, but the equivalent in weight of the blow caused by the imperfection mentioned. The impact of an engine would not increase as the square of its speed. Its momentum would increase as its speed, directly. If you drove that engine against a bumper at the end of the track and tried to measure the impact, it would increase as the square of the speed:

but we were not discussing that impact.

The amount of impact upon the rail depends on many conditions. A train entering a curve will produce an impact upon the side of the rail if the outer rail is not elevated. Assuming a six degree curve and the passage of an engine around that curve at 10 miles an hour with a flat track and rails level, there will be impact; with the rails elevated to the proper degree of elevation for that speed, no impact different from that on straight track. The passage of this locomotive over a straight track would produce impact, and would produce impact on a curve. The impact on the straight track, and also on the curve, would vary—be greater as the speed increased on the straight track.

Square of the speed would be a very small element in the determination of the amount of the impact in both cases, because the impact is caused in the main by certain other causes which have not been mentioned, the speed of whose movements are not directly related to the speed of the train. Impact increases with the speed of the blow and where imperfections exist in the track and in the engine with the speed of the passage of the engine over a track whether it is straight or curved. Imperfections always exist

1262 in both to some degree. It is uniformly true that impact results by the passage of the train and increases as it passes

either over a straight track or a curved track.

I think that there is necessarily some slippage one way or the other, of one wheel or the other, going around curves. I have observed it to take place, and I have heard it. I may be mistaken in respect of the coning or non-coning of wheels being the practice; in respect of the slippage, I say that it necessarily follows that there must be, through considerable part of the time, a slippage. Coning cannot be made perfect so as to prevent slippage. If there is coning, it would tend to reduce the amount of slippage, of course, and, under conditions that were real, at least, it would prevent it; that would be the purpose of the coning.

The total amount of the accounts which were apportioned between passenger and freight on the basis of wear was \$238,904., resulting in attributing to passenger 28.88% or \$69,019. If these accounts had been divided on a time instead of a wear basis, it would have increased the charge to intrastate passenger service by \$907.84, if the small account of exclusive passenger tracks be neglected. The total of the accounts apportioned by me to passenger and freight

on time was \$93,554, the passenger proportion being 29.12 per cent, or \$31,183. Had these accounts been divided on the wear basis, the charge to intrastate passenger would have decreased \$355.51, the net result of the two being that the cost of intrastate passenger business would have increased \$552.33.

The figures just read show the effect of the time basis or wear basis on accounts which were specifically divided on those bases,

but not of the amount of superintendence, etc.

1263 I want to say that I have looked further into a subject and discover that I was mislead in accepting a statement of Mr. Russell, to the effect that the wheels were not coned, and that my previous belief in that regard, derived from many sources to the effect that the wheels were coned, was correct. I was right, in the idea that the wheels were coned, up to two or three weeks ago, when I accepted the statement of a man I thought knew what he was speaking of, that they were not, and, in accepting that statement and speaking because thereof, I made a mistake. My work requires me to go over a great many fields; when I get into a subject where I am directly told by a man whom I believe ought to know such and such a thing, which is contrary to my previous belief, if I am greatly pressed for time, as I was on that occasion, I may be mislead then. If the weight were sufficiently greater on the wheel on the inner rail, the slippage would take place on the outer rail; it would slip backwards. wheels, when new, are coned; they wear, and the cone shape no longer exists, and they become cylindrical. The general effect is that freight car wheels that have been considerably worn have the conical shape largely worn from them.

In the Lackawanna Case I apportioned maintena-ce of way expenses on recentle train nuleage. There in Roadway and Track, Balast, Roadway Tools and Supplies, Work Equipment—Repairs, Renewals and Depreciation, and Removal of Snow, Sand and Ice, the common items on the line tracks used by the freight and passenger

trains was divided by me on the train mileage basis.

"Signals and Interlocking Plants.—Block and other signals apportioned entirely to Line; assigned to Freight, Line, on basis of 1264 Freight train mileage. * * Interlockers, terminals, so apportioned, assigned Terminal, Freight, on basis of freight

switch engine mileage; interlockers, line, so apportioned, against line,

freight on basis of freight train mileage."

"Over and Under-Grade Crossings—Apportioned between Terminal and Line by Bridge Department; Terminal assigned Terminal. Freight, on basis of freight switch engine mileage; Line assigned Line, Freight, on basis of freight train mileage."

"Tunnels.-All Line; assigned Line, freight, on basis of freight

train mileage."

"Bridges, Trestles and Culverts.—All Line; assigned Line, Freight, on the basis of freight train mileage."

"Maintaining Joint Tracks, Yards and Terminals—Taken as all Line; assigned Line, Freight, on basis of freight train mileage."

It was my purpose, in preparing Defts. Ex. 72, Thompson, to adopt the allocations as between states made by Mr. Delf in his work.

I did not adopt the allocation made by him in account 62, "Dispatch-

ing Trains."

In the Lackawanna Case, "Dispatching Trains" apportionment tween Terminal and Line on the basis of 25% and 75% (estimated 25% of the whole amount being applicable to instructions as to terminal placing of cars, etc., etc.). The amount so apportioned to Terminal assigned to Terminal, Freight, on the basis of Freight switch engine mileage, on the basis of freight train mileage.

Station Employees: In the Lackawanna case, I had an estimate prepared in respect of each station, for a given month, as to the

against freight, and applied those results to the year. The apportionment was made by the direct examination of the payroll for each station for a month, and the determination, as to whether each employee exclusively on passenger or on freight business, and if his work was common to both services an estimate was obtained of the relative portion of his time put in on each service. I considered each man's wages separately, and ascertained the amount of time he spent in passenger and the amount he spent in freight, and divided his wages.

I went over this property between St. Ignace and Marquette, and have been over portions of it before. I inspected it with a view to determining whether it was well kept up. In my direct testimony, I expressed an opinion as to the standard of maintenance; in this particular case I was guided by the reports given by my assistants, who inspected all of the line, and I formed an opinion of the condition of that which I went over. That is to say, I rode on the hind end of the passenger trains, watching the track. I should think the train ran from 25 to 35 miles an hour, perhaps 45 some places. I made several

trips over this part, I saw it all in daylight.

I said, on direct examination, that the maximum elevation of the outer rail on this line was eight inches. I do not know what degree of curvature you would find eight inches on this road; the point inter-

secting me at that moment was covering the maximum.

From my own observation, I claim to have enough knowledge to pass upon the standard of maintenance of this road between St. Ignace and Marquette. It is a good road, well maintained, up to the standard of single track roads in this part of the country of like

1266 class. So far as I have seen it, its main line is in first-class condition; I think it is suitable for the kind of traffic it has, and good for 40, 50 or 60 miles an hour, so far as track is concerned, and so far as I observed the equipment. I never meant any criticism upon the standard of maintenance of your main line common tracks.

In respect of three miles to one mile, I have assumed that the cost of maintaining side tracks was one-third of the cost of maintaining main tracks. The 13.32% is affected by the 3 to 1 I have spoken of

in respect of side tracks.

So far as I have seen the road, I have testified from my own observations and knowledge, beyond that from the reports of my assistants. I testified that, if there were no passenger business at all, this road would have to be maintained to its present high standard. The spur tracks to mines and son on are sufficiently maintained for the freight traffic. I did not say that on an average the maintenance of the main line costs 3 times as much. That has to do with side tracks.

These traffic spurs were included with the side tracks, and not as main tracks. My memory is incorrect; I had forgotten the fact. I say that I think that heavy traffic spurs to mines should be included as main track, and to that extent then my 13,32% exclusive — freight is an error. Other things remaining unchanged in the application of my method, evidenced by Defts.' Ex. 72, the greater the percentage of freight exclusive in Ratio 2, the less there would — in common, the less in passenger, and in intra passenger. If there be an error as to that, it is aganist you; the amount would be, however, small.

In the Lackawanna case, I divided a portion of the train supplies and expenses between freight and passenger on the basis of train miles.

"Injury to Persons was apportioned between Passenger and Freight on the basis of train mileage; amount apportioned Freight assigned 50 per cent to Terminal, Freight, and 50 per cent to Line, Freight."

'Crossing Flagmen and Gatemen,—Apportioned entirely to Line; assigned Line, Freight, on basis of freight train mileage."

Drawbridge Operations: "All Line; assigned Line, Freight, on the basis of freight train mileage";

Damage to Property, Damage to Stock on Right of Way, Operation of Joint Tracks, Net, in the same manner.

The Master: Do you answer from memory or belief that the brief is right?

A. I am answering from the fact that it appears in this brief in respect of a number of these items that I cannot remember.

General Expenses. "The total of amounts assigned Terminal, Freight, and Line, Freight, in all of the foregoing accounts are respectively divided by the grand total of all items as reported for all such preceding accounts, and the resultant percentages are respectively applied to the total amount of General Expenses and the resultant amounts respectively assigned Terminal, Freight, and Line, Freight."

Fixed Charges. "Total of Fixed Charges in the Nature of Taxes, interest and Rentals. To this total are similarly applied those percentages last above described (and those last above described are under General Expenses) under operating expenses, General Expenses, and the resultant amounts similarly assigned to Terminal, Freight, and

Line, Freight."

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In that case, the respective train mileage, freight and passenger, became factors, or elements in the factors, which were used to divide, not only general expenses, but also the fixed charges, in the nature of taxes, interest and rentals.

In the division, in this case, of account 2, Ballast, the amount used was the average of five years ending 1912, and being, Michigan \$3,-989.50. The average for the six years ending June 30th, 1913, would be about \$7,500.

Q. It would be quite as reasonable to average for the last six, wouldn't it?

A. Not if you put on \$25,000 worth of Ballast in 1913. The inference would be that you were perhaps putting some capital improvements on your road at the cost of maintenance, I should think. Ballast can be made a capital improvement. The addition of a considerable quantity of ballast over and above that which is on the road is, in my opinion, the nature of a capital charge. My understanding is that under some cases the road can treat ballast as a capital charge. I was answering, not upon the strength of what may or may not appear in the Interstate Commerce Commission's classification, but on what I believe the proper practice. I believe the proper practice in addition of new, but not in renewal of, ballast may be to add it to capital.

There is no reason why six years' average instead of five might not be taken here for ballast. I should think that the figure indicated

some change of policy on the part of the road.

Q. You think it is too big, so you took the five?

Mr. Wykes: I wish to object to that inference contained in the question, because, when Mr. Thompson's allocations were made, the 1913 figure was not available, and, in the figures that Mr. Parker has put into the record for 1913, six years were used, and the larger figures that you are talking about were used for that year, and the first time they became available.

A. If I had been aware of the amount and had known that it was the mere renewal of ballast, I should have taken six-year items. I

don't think any other course would have been allowable.

In the divisions by my gross ton miles, Ratio 1, I have disregarded speed entirely. I believe the speed of the passenger trains in this case causes more mechanical wear than the freight trains, but that the amount is a small percentage, and probably not over 15 per cent due to speed alone, and that that figure is offset by other figures or other inferences upon the other side. Therefore, the additional element of damage due to speed alone would be counteracted and offset, is an element affecting wear. The speed of the passenger trains wears the track, and the things that wear, on the average 15 per cent more than would the same trains if they moved at the freight speed. fixed it as the opinion of eminent engineers that, the rate of speed becoming very high, the damage to the track becomes less. same principle as a man skating over thin ice, the static load is, in effect, decreased. "Static load" means the weight supported by the track when the train is standing still.

I said that the dynamic augment did not pass the limit of the elastic resistance of the track structure until speeds of 30 or 40 miles were reached. "Dynamic augment" is the increase in the weight upon the track due to elements that come into being when the train is moving. They are due in large part primarily to the imperfect counterbalancing of the main and side rods of the engine, rather than to the

movement per se, but they take place when the train is mov-

1270 ing; as compared with static, it means it is moving?

The conception of the elastic limit may be very simply stated, as follows: If a body be stretched or bent or otherwise deformed to an extent that is within its elastic limits, it will spring back to its original form. If, however, the deformation passes the elastic limit, it will not completely return. (Counsel reads previous questions and answers of witness.)

Q. Having called your attention to that testimony, I want to say that it did not give me the impression, and I don't recall any testimony in your direct examination which did give me the impression, that you are of opinion that the average speed of the passenger trains increases the wear of the parts that do wear 15 per cent over and above what such wear would be by such trains if those trains moved only at an average rate of 16 miles an hour, and I understand that as just stated is your opinion?

A. Yes, it is. Static load is the weight of the engine—let us confine ourselves to an engine standing standing on the track, that load is augmented by movement, and increases, other things remaining the same, when the speed increases, but not directly with the speed.

Other things being equal, the speed is a very important factor in determining wear. It is so important that, other things being equal, a speed of 27 miles per hour would damage the track 15 per cent more, in my opinion, than a speed of 16 miles an hour. That 15 per cent represents the result of a series of experiments conducted on a railroad by T. M. R. Talcott, an engineer and operating railroad man whose headquarters are at Richmond, Virginia. His experiments were re-

ported in a book written by him on the subject. I don't re-1271 call the title at the instant. So far as I know, that is the only

comparative record on the subject. I thought it bore the indicia of being truthful and correct. I do not now recall of having stated this truth in my direct examination; I only answered the questions that were asked me, and answered them as fully as occurred to my mind at the moment. It was not my intention to give the impression that speed ought not to be taken into account as one of the elements of the whole problem.

I was of the opinion that the amount of power availed of to move the trains would measure, in a reasonable sense, the wear upon the tracks, and I am firmly of opinion that the difference in speed from 16 to 27 miles an hour would increase the injury, taken as a whole, resulting from the use and passage of the train, at least 15 per cent.

Well, I have to say that there apparently do not exist a great number of experimental determinations of this sort, and I availed of those which I could, together with such experience as I have, and my reasoning power to such extent as I have that. I should expect that the relation would be greater in case the speeds were increased to 20 and 40, and that the damage at the 40 would be somewhat more than 15 per cent in excess of that at 20. I am not able to say, offhand, how much greater. I think that the injury at 50 would be markedly greater than at 20; it would be more than the 15 per cent.

I divided ties all on the weight basis, because a majority of the

dollars were expended because of wear, and not decay. If the proportion due to wear and that due to decay could be ascertained, it would be more exact and scientific to divide each proportion by its appropriate factor.

The cost of repairing damage that is caused by any particular traffic should be charged against that traffic, and those costs not caused by any particular traffic, but which run with the lapse of time, should, in my opinion, be charged against the several

of time, should, in my opinion, be charged against the several traffics ratably with the proportions of time through which they use the property. I do not think there is any other basis at all, except the time basis, appropriate for dividing the weather stress items.

Repairing a washout is weather stress, and ought to be divided on a time basis. Washouts occur at unknown and variable intervals through a series of years; the cost of repairing them has to be borne by the property as a whole, and I think it should be charged against the several classes of traffic in the porportion in which they avail of the property. If the fence is out of repair, and a bull gets through the fence and derails a train and breaks down a bridge, I think the bridge ought to be restored on the basis of time, because, to carry your suggestion to its logical absurdity, in the course of so many years so many bulls would break through so many fences.

I don't think the speed of trains has anything to do with it. I have in my answers endeavored to point out that whereas you use the speed of trains in connection with my time ratio, I refer solely to the elapsed time during which the trains avail of the facilities. The speed of the passenger is 27 miles, and freight 16; that makes 43, added together; 43 into 16 will give about 36%. I should think that the excess of about 7 per cent is due to the additional time that the freight train is at the station over the time the passenger is at the station.

I recognize, of course, the distortion of my views into your hypothetical case; I recognize also what you say logically follows, but I don't think that destroys the value of the views.

1273 Q. Now, I am trying to ask you what relation to that subject the excessive time of the freight train at the stations between terminii has to it?

A. You carry in your question a very nice little inference, which is that the freight trains are standing in front of these stations, whereas, in considerable part, they are switching on the main track, the sidetrack, etc., and are availing of properties in respect of bridges, probably the fact is that there isn't very much switching done over bridges; to that extent your argument is reasonable.

Q. It appears from one of the Delf exhibits that 32.2% of the time of the freight trains with certain exceptions, is spent at stations, and that much of that time so spent at stations is spent on tracks that have been assigned by the defense here, and by you, to exclusive freight uses; now I want to ask you what relation has the time spent on sidetracks assigned to freight, by freight trains, to the problem of dividing the cost of renewing a bridge, or the ballast between stations, or the fences between stations?

A. It has none, whatsoever.

Q. Or maintaining ditches, or embankments, or slopes?

A. It has none, and were the figures capable of sufficient refinement to extract these elements of error, I should say that they should be so extracted.

I stated that the average speed of the passenger trains while moving was 27 miles per hour and freight trains 16 miles per hour while moving. What I did was: I made examination of the dispatcher's reports for March 30, April 15 and 30, May 15 and 30, and

reports for March 30, April 13 and 30, May 13 and 30, and 1274 June 15 and 30, 1912; the examination covered 42.5 miles out of 198 on the Mackinaw Division, between Marquette and Wetmore, 45.9 miles out of 94 on the Houghton Division, between Marquette and Nestoria, and 35 miles out of 99.6 on the Western Division, between Covington and Bruce's Crossing. It is possible that, if a complete examination was made, those figures might be varied one way or the other, but I don't think the variation would

amount to much.

I think the damage to track caused by a train running 60 miles an hour is considerably more than that caused by a train running at 10 miles an hour. I cannot attempt to state how much more, offhand; an opinion of that sort, given offhand, would be of no value. "Critical speed" is a term used by engineers. The use of the term "critical" by engineers is that which indicates the change from one set of results to another set, occurring distinctly at a given point as in the matter of speed, a given rate of speed or a given degree of temperature in some other problem; 27 miles an hour might be a critical rate of speed on some structures. I think that would depend entirely upon the nature of the structure. The critical speed varies with conditions.

Railroad managers recognize that speed is an important factor as to strain on bridges and the requirements of strength and the like, by limiting speed on bridges that are weak. I think it clear that the movement of a train at as low a rate of speed as 27 miles an hour, or even 10 miles an hour, over a bridge imposes more stress upon the bridge than with the same load standing still. I think that the difference of 10 miles an hour is very slightly perceptible, and 20 miles is considerably perceptible. It goes up pretty fast when you get 20 miles an hour, and along 30, 35 and 40 it goes up fast. I don't think it is true that freight trains never reach 35 or 40 miles on this road. I think they frequently run as

1275 fast as the passenger trains. I think they frequently run
40 or 50 miles. I think you would need just as good bridges
and structures for the freight trains at their speeds as for the pas-

sengers at their speeds.

The size or weight of the train did not make any difference in the time element, except if the trains were of great length it would probably increase the time required to get over the road. Within the limits of 30 cars compared to an engine and a caboose, it

wouldn't make any difference.

Q. The Geological Survey department of the Government of the United States is accustomed to use the railroads of the country, with their consent, to get over, and to use these little velocipedes, sometimes called "speeders"; They don't go very fast at times. Under this time theory, assuming the Government was to pay its share of the weather stress items, there would be chargeable to this speeder,

going over the road at 4 miles an hour, as much as there would be to ten passenger trains at 40 miles an hour, on the average?

A. Yes, I recognize the conclusion that follows from your assumption, but I think as a matter of fact the speeder would have to get off

of the track and out of the way.

Q. Assuming there was no train coming, as is the case nine tenths of the time on all parts of the South Shore road, the track is idle, and a speeder goes by on an average of four miles an hour, for a hundred miles, under your theory it would be justly chargeable with as great a proportion of the weather stress items as ten passenger trains over the same hundred miles at 40 miles an hour, would it not?

A. I see that that apparently follows from your assumptions. Whether or not a careful examination into the components 1276 of the hypothesis would make me say yes after I had so examined, I don't know; it is one of those things that appear to

be perfectly simple on the surface but may not be when analyzed. Q. You think, do you, that, as far as the weather stress items of maintenance of a toll bridge is concerned, the child trundling across it with her doll at two miles an hour should be charged ten times as much as the automobile spinning across it at 20 miles an hour?

A. If the cost is made the basis of the charge for the service and the child and the automobile respectively had exclusive use of the

bridge, I think that that conclusion follows.

Q. And that would be true even though there was nobody to use the bridge for that week or month except the child and the automobile, because the idle time for the rest of the month should be charged ratably to the time occupied by the child wheeling her doll across the bridge and the time occupied by the automobile spinning across at 20 miles an hour, each being a use exclusive of the other?

A. I think that follows. We are of course endeavoring now to find costs that have taken place in the past. It is not a new plan; it is very old; the application of it to railroad practice is the only

thing new about it.

The Master: With regard to apportionment of waste time you were speaking of the other day, what is the connection between time wasted and time used that makes it proper to apportion time wasted on the basis of time used?

A. It has this connection; if statistics are being compiled for the purpose of ascertaining how cheaply the service can be performed, with the intent to get enough business to keep the

facilities full all the time, then your statistics should be cast up without regard to idle time, because the idle time can be availed of, in the event you can sell your goods so cheaply that you can get enough business to completely avail of your facilities, but if, on the other hand, you are trying to find out what it did cost you in the past to make two different things, it is good practice and customary and standard cost accounting practice to charge to the two things the idle time on the same relative proportions as the availed of time.

The Master: The road is holding itself in readiness for the freight traffic and passenger traffic, one as much as the other, when it is not

being used, isn't it?

A. Yes.

The Master: Why shouldn't it then be apportioned equally, if at the time it is idle it holds itself in readiness for either branch of the traffic?

A. We are trying to determine what happened to it in the past. Now, if, as a matter of fact, in the past, let us say 90 per cent of the time used was in freight business and 10 per cent was in passenger business, but the sum total of these was only 50 per cent of the whole available time of the road, then it would be quite clear, I think, that the expectation of the road, looking toward filling up the other 50 per cent, would be to get 90 per cent freight business and 10 per cent passenger business; not that half of the other 50 would come from freight and half from passenger when 90 per cent of that which had been used was used for freight and only 10 per cent for passenger; I think it would be an unreasonable expectation.

The Master: I am unable to see why, in regard to the past, the unused time should be apportioned on the basis of used time. It would seem to me, if it is apportioned unequally, that it should be in the inverse ratio rather than the direct ratio.

A. No sir, I don't think that would be reasonable. What happened; what were the conditions existing in the territory? It would be perfectly good accounting to say that the wasted time should be charged neither against the passenger nor against the freight. You can say it should be charged against neither, and should form the subject of a fiscal charge, or general loss, against the capital of the company, but it wouldn't be good accounting to charge it equally.

If the company has gone into a business in which it has established a plant vastly greater than can be availed of by the goods it can sell, then the cost of maintaining that plant or the excess part of the plant may be in the nature of a charge against the fathers, if you please, of those who built up such a big plant. That is the only place it could be charged, unless it is distributed ratably between the services on the basis of the actual availment by each, and that principle is universally recognized in cost accounting, and can be found stated in many books written by authors of standing. This time element is used as a factor to divide weather stress expenses related to the main line, merely because that is the common portion that is to be divided—the main line and passing tracks ancillary to it. The principal part of the amount that I have distributed on the weather basis is the maintenance of the main line and operation of it.

I don't intend to criticize anyone at all, but it may be you overbuilt if you built any railroad at all. I certainly meant no reflection upon the policy of your company, but it might be that you

had a railroad where there was no business for a railroad 1279 whatsoever. I do not intend to imply any criticism as to the location of this road, or claim that it is over-built; I am merely connecting up your question with my remarks to the Master. It might be that you people may have built a railroad where there was no business for a railroad, but that is not within my province.

Q. I would like to have you give attention to the question closely, because I have written it out almost entirely. It appears that the

density of train movement is very light on this road, and that many more trains could be run. Now, assume that a freight train moves 6 miles between passing tracks in 30 minutes, but does not interfere with or delay any other train, why should it be charged more on account of the weather stress items, like fences, bridges, etc., than if it made that six mile run in six minutes? I would like to have

all of your reasons for that?

A. My view on that is this: The items of expense which run with time and have no relation to mechanical wear caused by any particular service, should be charged against the services in relation to the time through which the traffics availed of the facilities. the freight traffic, were it carried in common equipment, would be chargeable with the expense of such equipment during the time that the freight was loaded in it, and likewise in respect of the time that the freight trains are availing of the tracks. That seems to me to answer your question, but, if it is not in sufficient detail, I should be glad to go further.

Q. I am satisfied with it, if you are.

A. Well, you have the advantage of me, of having seen your question written out; I have not. If, after I see this in writing, I want to expand it, I should be glad to avail of the opportunity. I think of nothing further at the moment.

1280 Mr. Butler: I would like the record to show that you have had full opportunity to give all of the reasons that occurred to you at this time, and also that you be insured opportunity to expand your reasons if after reading your answer you would like to do so.

I did not ascertain what the operating percentage on the total passenger business in Michigan would be on the basis of my determination of its cost after eliminating the amount that I assigned as the cost of the sleeping and dining cars. I made no attempt to get any figures in respect of revenue. My own view is that the operating ratio is a comparative figure only. That is to say, its principal use is in comparing one year with another on the same

The Interstate Commerce Commission statistics show it, and they make the comparison one road with another, possibly, but, whereas that comparison is very frequently taken by people to indicate the degree of expensiveness of operating, as a matter of fact, it does not necessarily show that, because one of the elements is the amount of money received, which would be affected by the rates, regardless of

the cost of operating.

Q. By taking from Complt.'s Ex. 48, Delf, sheet 3, the revenue of \$805,532 for the passenger, and \$9,634 for baggage, giving a total of \$815,166, and dividing it into your operating expense after eliminating the \$112,000 which you assign to the dining and sleeping car, there is left \$364,809. Also, eliminating the \$57,000 odd which you assigned to mail and express, it is disclosed that the operating percentage for the total passenger business in Michigan on the

basis of your calculation is 44.7%. Is that a high or a low percentage when compared with other roads generally?

A. It is a very low percentage when compared with other 1281 railroads generally. But, in making this comparison, it is necessarily made with figures which are not comparative; i. e., in the expenses of roads generally, the cost of hauling sleepers and diners and mail and express is included. Including that, and making calculation on the same basis, the operating percentage is 57.7. It is a low operating percentage. The conditions on the South Shore, especially the sparsity of traffic, the few persons per car and per

train, and all that, make for high cost to earn a dollar.

I would expect a much higher cost on the South Shore than I would on the New Haven, the Pennsylvania, the Baltimore & Ohio, or the Norfolk & Western, which is perhaps the best Southern freight road. I do not know whether the South Shore would be able to earn a passenger dollar any cheaper than the Norfolk & Western. I know there has been an application for increase of rates in the I have followed the application for an increase of rates by eastern railroads, and know of the Government's employing Louis D. Brandeis, a very eminent lawyer of New England, to represent it in those matters. I remember newspaper comments on his argument on April 30 and May 1st, before the I. C. C. I read the article in a daily paper.

Q. That argument is abstracted in the Railroad Gazette of May 22, 1914, page 1133. It is there indicated that the roads have been unable to introduce in the passenger department economies that have been introduced in the freight department, and that in consequence the expense incurred in the passenger service has increased much more in proportion than the earnings from passengers, mail, and other passenger train business, that on all roads in the eastern

territory which try to allocate their freight and passenger expense, the passenger business is being handled at a loss. I 1282 want you to assume for the purpose of your answer that the

statement I have made, as taken from Mr. Brandeis' argument, is true in point of fact, and then ask you whether or not on that assumption you do not readily reach the conclusion that your determination, that it costs only 44.7 cents in Michigan for the South Shore road to earn a dollar in the transportation of passengers is wrong?

A. No, I do not reach that conclusion, and there are reasons for

that, one of which I would like to state.

Q. It is also stated in Mr. Brandeis' argument that Harold Elliott, of the New Haven road, reported to the stockholders, according to Mr. Brandeis, and "He said more than 50 per cent of the revenues comes from passenger trains and for passenger trains the cost of operation is so great as to leave nothing whatever for taxes or ininvestment." Now, I want you to assume that that statement concerning the New Haven road is true, in fact, and ask you whether or not that would in your mind tend to shade any doubt whatever upon the correctness of your determination, that the South Shore road, in Michigan, can earn a passenger dollar on the one basis you have used for 44.7 cents and on the other basis for 57.7 cents.

A. No, it would not.

Q. It is also stated in this abstract of Mr. Brandeis' argument, that: "The science of railroad cost accounting is almost in a rudimentary state, but Mr. Willard"-meaning Daniel Willard, president of the Baltimore & Ohio, "an experienced and efficient railroad manager, when he came upon the Baltimore & Ohio Railroad in 1910 recognized that an attempt must be made at once to separate passenger service from freight service so far as cost accounting was concerned, and we have, beginning with 1910, an attempt to allocate expense between passenger and freight. A considerable success has been attained, in allocation specifically of 70% of the total,

leaving only 30% to be apportioned. Taking these figures 1283 subject to all of the criticisms which we know they must be subject to owing to the limited perfection in the comprehension of railroad science, and what do we find. We find taking the figures for the first full fiscal year which we have, the year ending June 30, 1911, and comparing them with the figure for June 30, 1912, exactly what we would have expected in respect to traffic under Mr. Willard's efficient administration because the broad ratio of operating expense has been reduced in that two year period from 68.16 per cent to 66.44 per cent or nearly two points. At the same time what do we find in regard to the passenger traffic? We find that the passenger cost in those two years, according to these figures, has increased from 82.39% to 106.23%, showing according to those accounts that the passenger traffic in the year ending June 30, 1913, absolutely cost the Baltimore & Ohio Railroad six points above, that is 6%, without taking into account capital charges. Applying that upon the total passenger revenue we make the increased operating expenses for the passenger train service of over four million dollars more, as a matter of fact, than the total amount that the 5% advance upon all the freight rates would amount to taking the year 1913 as your basis.'

Now, I ask you to assume that the statements which I have just read are true, in point of fact, and then ask you your opinion whether or not they shed any doubts or questions upon the correctness of your determinations, first, that on one basis the South Shore road in Northern Peninsula of Michigan can earn a passenger dollar for

44.7 cents and on the other basis for 57.7 cents.

A. No, they do not, to my mind. I did not consider them comparative.

Q. Mr. Brandeis also is here reported as making this statement

concerning the Pennsylvania:

"On the Pennsylvania system it is not a new thing to separate the accounts. They have been doing it for just half a century. Every year the Pennsylvania road has given to its stockholders a statement showing the separation of freight and passenger earnings and expenses. It shows exactly the same trend which he found on the Baltimore & Ohio. The figures are somewhat different the spread is somewhat different. And it may be because of difference in the efficiency of management. But what do we find? We find that in 1907 the operating ratio of the Pennsylvania for freight was 71.6 per cent. In 1913 its operating ratio was 73.4 per cent. There is a

difference of 2.2 per cent. In these six years you have had no doubt ten or more per cent increase in wages; you have had an in-

crease in taxes and you have had those increases in legisla-1284 tive burdens; but the efficiency of the Pennsylvania management dealing with its freight has enabled it to keep down these operating expenses to 2.2 per cent and keep them down there in spite of that liberal charge of maintenance and equipment and maintenance of way on which Mr. Lyon and Mr. Thorn have spoken. In 1907 the passenger ratio was 74.4 per cent. It differed there very little from the freight, which was then 71.6 per cent, an increase in these six years of 18.2 per cent whereas the freight ratio had risen 2.2 per cent.

Assuming that the statements that I have just read to you concerning the Pennsylvania are all true in point of fact, are you still of opinion that the South Shore road in Michigan can earn a passenger dollar for 44.7 cents? I want you to assume that your figures when divided by the proper amount of revenue, disclose that fact, to-wit, that, on the basis that you have used, a passenger dollar can be earned by the South Shore road in Michigan for 44.7 cents, and then ask you, assuming the statement concerning the Pennsylvania to be true, whether you are of the opinion that the South Shore can earn a passenger dollar in Michigan for 44.7 cents; that is the opinion I want.

A. My opinion in this case is the same as that stated by me. Q. Are you of opinion that the South Shore road, in Michigan, in 1912, did, in point of fact, earn a dollar in the passenger business, on the basis you employ, for 44.7 cents.

A. I have no opinion about that, because I do not know what they earned. Assuming that your statement of the earnings are true, I

think they did, and feel pretty certain about that.

Q. Concerning the Norfolk & Western, it was said by Mr. Brandeis,

as reported in the Railway Age-Gazette, as follows:

"To the south of the Baltimore & Ohio was another railroad which everybody recognizes is peculiarly well managed; allied with the Pennsylvania and having in Mr. Johnson an extremely 1285

competent president, the Norfolk & Western. Its conditions are different. They too have undertaken to separate the passenger and freight service. They have done it since 1907. Apparently when they started they took as their basis the same operating ratio for the two, which was 64.8 or 64.7, the operating ratio of both freight and passenger. What has the movement been? In freight but slight increase. It increased from 64 to 65, an increase of a little over one point, but in the passenger service the increase has been 64 to 72."

Now, I ask you, assuming that the same method for the determination of the operating ratios, freight and passenger respectively, was on that road followed from 1907 down to and including 1913 and applied to the results of each year, whether or not in your opinion the cost of doing the passenger business has been advancing in the last 6

A. I think that that would indicate that the cost has been so advancing.

Q. Now, I want to ask you whether or not in your opinion, assuming the statement concerning the Norfolk & Western, the Pennsylvania, the New Haven and Baltimore & Ohio, which I have read to you in this morning's examination, to be true, and assuming further, that the methods for the ascertainment of the operating ratios, freight and passenger respectively, were well adapted to disclose the actual truth, and the best that could be devised by skilled accountants familiar with the property concerning which they keep the accounts, the South Shore road had an operating ratio in its passenger business in Michigan in 1912 of 44.7 per cent, on one basis you have stated, and 57.7 per cent on the other? Assume that derived by dividing your operating expenses by the proper amount of revenue? I would like to have you answer it, in the interest of saving time, affirmatively or negatively, and then explain

1286 your answer, and not only that answer, but give the reasons which you asked permission to give sometime ago and which I asked you to defer until I had concluded on these matters?

In response to that portion of your question which directed me to go back and state some reasons that I was about to give in explanation of one of my earlier answers, I will now say that I consider that the conditions of operation of the roads that you have mentioned, and the expense items that came into their accounts, are wider than from those which appertain to the South Shore road, and among these are the facts that a number of these eastern roads have very expensive passenger terminals, the cost of whose upkeep is admittedly an expense which is out of proportion to any additional revenue that might be derived because of the expense of such terminals; that of the Pennsylvania, in New York, I am informed cost so much money that the charges for depreciation and interest on it amount to about \$1,000 a year per mile over the whole system. The cost of upkeep would include depreciation and operating expenses attendant on maintenance of the buildings, and I have not now before me any figures which separate these from the interest charges. I was also intending to refer to the expenses of terminals jointly used by the B. & O., Pennsylvania and the Norfolk & Western, in Washington, and the expensive terminal of the B. & O. at Baltimore, and others. Further, these railroads run large numbers of heavy, high speed trains which are made up largely, and frequently entirely, of sleeping and parlor cars, and the earnings in these trains, which frequently carry but a small number of passengers proportionately, are low relatively to the large train expense; and the expenses that these roads charge against the cost of passenger service include all expenses of hauling such cars.

The New Haven is not comparable with the South Shore, for several reasons. One is, the New Haven does a large commuter business, with low rates, running about 6 miles. They haul more people in a car than the South Shore.

One of your questions assumed the same methods of accounting had been in vogue during all the period mentioned, and others did not make that assumption, and if as a fact changes in methods of accounting took place during the period, they might materially affect the results shown, and further one of your questions assumed that the method of cost accounting was the best that could be devised, but other questions did not make a like assumption.

Q. I want you to answer on the assumption that the accounts were well kept and the best that could be devised to show the truth?

A. And I will continue to answer as before I was interrupted. That is, as a matter of fact, these systems of accounting were not so devised as to show the truth; the error well might become cumulative through a series of years.

Q. My question requires that you assume that they are the

best that could be devised to show the truth?

A. On that assumption, I gave full and complete answer as I was requested to, "Yes," and then I paused to indicate I had completed my answer and I made no attempt to qualify or modify my answer, and then I stated, I think very clearly, that I would continue, as I had been directed to do, to give an explanation of the reasons why I was going to modify an earlier answer, and those reasons I was giving when I was interrupted.

I am advised by counsel that, where I have begun to answer a question which was made to me upon the record and have answered a part of it and opposing counsel instructs me to modify his original question. I should proceed to answer the original question

the stenographer's notes, and in view of that instruction from counsel I will now continue to answer the earlier question as it was originally put, as I understood it, just what I was doing when I was interrupted, and I will go on to say: That this is also involved in the figures introduced in the Eastern Rate cases, namely, the possibility that if the rates of passenger fares had been reduced the passenger earnings as a whole would have increased and the profitableness of carrying passengers might have increased. That completes my answer that I was endeavoring to give to the question at the time I was interruped. A number of these eastern lines, some of them especially, are exposed to active competition in the passen-

Q. On page 19 of Defts.' Ex. 72, Thompson, there is a ratio called Ratio 2, and part of that is freight exclusive 13.32. Is that 13.32 correct, and if it be not correct, give us the correct figure, if you

are ready, and if you are not ready, say so?

ger business from interurban electric railways.

A. It is correct, as I intended to make when I made the exhibit, because at that time I did not have the information that some sidings were maintained by the individuals. I am prepared to furnish the figure which will express the subtraction from side-tracks and the like and those which are maintained by the individuals, and the result is to decrease the figure of 13.32% by 62/100ths of one per cent, leaving the figure 12.70%, with a like increase, of the figure 86.59%, by 62, to 87.21%.

I stated yesterday that if it were the fact that mining spurs which
I included as sidetracks were heavy traffic spurs requiring

large expenditures for maintenance, in such case I thought it would be requisite for me to transfer those spurs from sideiracks, where I had grouped them, to main tracks. Since the session of yesterday, I have looked into the subject and have discussed it with Mr. Hone, my engineer, who was more familiar with it than myself, and I have also read certain portions of the record in this case in which plaintiff's witnesses testified that the cost of maintaining these ore traffic spurs is about 25 per cent more than the cost of maintaining the sidetracks, and also the testimony of plaintiff's witness. Delf, to the effect that the cost of maintaining side:racks as a whole is about a third of the cost of maintaining main tracks, and in view of these things I think I do not care to adjust my percentages further by carrying the mine spurs from side to main tracks.

In respect to account 63, "Station Employes", I adopted Mr. Delf's figures so far as he had allocated them, and then I divided the com-

mon on the allocation.

I agree that if, at the Soo, St. Ignace, Houghton, Ishpeming, Negaunee or Marquette, there were no exclusive passenger employes and only one or two on the line, it wouldn't get right results to make the division by the allocations, because it would take all

the common into freight, practically,

Of the sum total allocated by Delf to passenger and freight, passenger exclusive amounting to about 15 per cent and to about 85 per cent of the total, assuming that Negaunee and Ishpeming would be fairly representative, then it would charge too little against The Soo is a very important station, and the fact passenger. that it has no exclusive passenger up there, because of the Union

depot arrangement, would have some bearing upon the cor-1290 rectness of dividing the common on the basis of the alloca-

tions. If it be a fact, for example, at Houghton, that the exclusive freight employes are engaged in handling freight, that doesn't affect the work at the intermediate stations on the line. That would also tend to impair the correctness or veracity of the division on my basis of dividing the common by the allocation

percentages.

The correctness or incorrectness of my basis of dividing the common portion of this item depends upon a study of the situation and an analysis of the work done by the exclusive freight and passenger men, and all of the facts bearing upon the question. I did not verify these figures or analyze the work of thee men, as in the Lackawanna case, to find closely what each man was doing. I kept very close track of what my men were doing, but I did not attempt to check their figures back to the records or find out what your station men were doing, except as disclosed by the figures in the payrolls or accounts.

In connection with what you have just said about my personal familiarity with these things, I would like, if I may, to be permitted to state to the Master and because it has been stated on the record very strongly by counsel for the plaintiff that "this witness appears to be unfamiliar with the details," that at the time this work was

under process, and it was completed early last summer, I was very familiar with all that had been done and could readily have discussed any of the detailed subjects, although, of course, I couldn't have gone into the question as to whether transcripts were correctly made from plaintiff's record, and that since then, about the middle of October, I was very seriously injured; my spleen was ruptured by a collision between an electric baggage truck and

1291 myself, and I was in the hospital for some months after it; verw narrowly escaped; and one of the effects of this injury, and the surgical operation which followed, was to markedly impair my memory for details, the things that were in my mind before; but since then I have endeavored to get back into my mind the details in this case, but I was instructed by counsel that it would be unnecessary for me to spend a great deal of time and study endeavoring so to do, as the matters of detail could be proved readily by my assistants, and it would be sufficient if I was familiar with the principles involved.

I adopted Mr. Delf's division of the station employees in this case as follows: He allocated the Michigan total to passenger, freight and common. I divided the common on the basis of the allocations made by Mr. Delf to passenger exclusive and freight exclusive in Michigan. I subsequently reduced the charge to passenger by 10 per cent assigned

I found that 2.75 per cent of the total freight time in this time calculation on which Ratio 4 is based was due to the delay of freight trains on account of the passenger business. That 2.75% was subtracted from the freight time. It was not added to the passenger. Assuming it right to add it to the passenger, the time and not the per cent should be added; that time would be more than 2.75% of the passenger time, or over 7%, as the passenger time is less than the freight.

The truth of the results produced by the train mileage basis, or the degree with which the results of that basis would approximate the truth, would vary with the speed as well as with train loads, and with train constituents and with weights and number of wheels and wheel impacts, and all of these various items.

I wouldn't say it was my opinion that there are no refinements on plaintiff's track that are not made on account of the passenger business. I am not familiar with the manner in which this company does in fact remove snow and ice in case of storms, and did not intend by anything I have said, in direct or cross, to indicate what the fact is in that regard. I thought the fact was immaterial. I have no doubt that they hold the freight trains until the storm subsides, but I don't think the fact is that they plow it for the benefit of the passenger trains; I consider that notion absurd, and I would consider that absurd if I had never been on the Northern Peninsula and had never seen the road.

Q. And you would set up your opinion against Mr. Lytle, who has spent his lifetime operating that road, wouldn't you?

A. In that respect, I think Mr. Lytle had not analyzed into what

he was saying. I think, in general, passenger trains ought to be pre-

ferred over, and have the right of way against freight trains.

Q. In the opinion of the Buell case (1 Wis. R. C. 427), to which you referred in your direct examination, I find this statement: "Thomas F. Woodlock and others hold that that part of the cost of maintenance which depends upon traffic should be apportioned between the different departments of the service on the basis of the locomotive mileage, switching included. This position may be well taken for many authorities hold that the locomotive mileage alone is responsible for at least one half of the wear and tear of the track." Do you agree with the statement that the locomotive mileage alone is responsible for one half of the wear and tear of the track?

A. No. I disagree with that,

Q. Do you agree with the statement that the engine mileage, plus freight and passenger switch engine mileage respectively, when there is no separation between terminals and line, is a proper basis for the apportionment of the common expenses due to

wear?

A. In respect to that, I think if the switch engine mileage is added the result comes nearer the truth, but I don't agree with the method. I think it is wrong. A locomotive on a passenger train is, as a rule, a much greater percentage of the total weight of the train than is the locomotive on the freight train. The locomotive weight does more damage to the track in respect of impact injuries than an equal weight of empty cars, though in respect of static load it is less so. As to loaded freight cars, I think that, in the case of some of the modern freight cars with very heavy axle loads, the difference is not so great. There is a static load when the train is moving. The static load is a load when the train is at rest; that load continues when the train is in motion and is increased by what engineers call the dynamic augment.

Q. A moving load is dynamic augment into static load, and you

have only static load alone when the thing is standing still.

A. You have static load when it is standing still, but it is not "into," as you stated, it is "on to." I have a general recollection of

the Buell case, but I don't remember its details.

Mr. Butler: It is just preceding page 425, the discussion of several pages there; that is what I draw from it, that the railroad companies claim that the train mileage did not assign to the passenger enough of wear items. Then I find, on page 425, this statement: "If this conclusion is sound it must inevitably follow that that part of the expenses under maintenance of way which depends upon or is caused by train mileage, may be fairly apportioned between passenger and freight traffic on the basis of the train mileage."

A. Well, I will have to answer that in two sections: I will say that, as a hypothetical answer on the assumed state of facts,

I would be forced to agree, but, as a matter of fact, my opinion is that the notion among railroad people, that a passenger train mile is equivalent to a freight train mile, is a mere inheritance from early days when freight trains were light, and that the increase in the

weight and length of freight trains has entirely changed the circumstances.

Q. Was that the old rule?

A. It was the old, early rule, yes.

Q. And even as late as a few years ago it was universally used to

divide the common expenses, wasn't it?

A. I don't think it was generally used at all, but it was included in reports of some companies down to about 1893, as I recollect. The train mileage as the basis for the division of the common expenses was used in some of the following cases: The Minnesota cases, the Missouri cases, the Arkansas cases, the North and South Dakota cases, and the Lackawanna case. I have a list which is set forth in a publication of Mr. Muller's that shows comparatively all the various bases that have been used (Defts.' Ex. 80).

Assuming a straight track, a steep grade and a train going up it, grade is not an element of impact. I would not say that, if you were running a train 60 miles an hour up a five per cent grade, there would be no impact on the grade. There would be. The speed which is to be squared is the speed of impact of the weight upon the track, not the speed of the train. In the case of a locomotive, the chief causes of impact that vary with the speed are the imperfect counterbalancing of the side rods, the angularity of the main rod, the rocking of the enterprise process.

gine upon its springs, the effect of the reciprocating motion being applied first at one side and then at the other, in respect of sideway stresses, and the imperfections in the track, as at low joints. Track that is subject to carrying heavy traffic becomes depressed, particularly at the rail joints, and at these points of de-

pression the blow of the engine is increased; furthermore, when there is no depression, there is impact as the wheels jump over the slight

open space between the rails.

Going to the cars behind the engine, the principal cause of augmented impact is to be found in the difference between the type of springs under the different cars. The term "critical," properly used, means the point at which the injury due to speed begins to decrease, and thus, in the case of very high-speed trains, the injury to the rail joint is less than in the case of lower-speed trains, but this same term "critical" is frequently used, in a somewhat improper sense, to mean the point at which the injury increases. The true meaning of the term "critical," in respect to a change in effect, is a point at which the acceleration of change becomes retarded and the contrary effect from that which perhaps might have been expected occurs.

It has been determined by experiment that trains running at very high rates of speed fatigue the rail joints less than trains running slower. The difference in the effect of speed on a long and short span bridge is, as I understand it, that on the longer span bridge the elasticity of the steel absorbs the shock. I am not aware that there have been any experiments to determine that thing on a wooden bridge. These conclusions have been a matter of research by me. I consulted a number of books in respect to this particular thing.

Mr. Sellew's book, so far as I recollect it, doesn't refer to critical

1296 speed in respect to spans on bridges, although it does refer to the German experiments that determine that high speed trains injure the track less than the low speeds; I mean the very high speed Some of the other books that I have read in the matter are Tratman on Railway and Track Work and Byers on Railroad Opera-I think that their discussions in respect to the effect of speed

have to do with the effect upon the tracks.

In respect to the bridges experiments, the matter was excerpted and brought to me by my former chief engineer, Mr. John S. Worley, now a member of the Federal Valuation Board of the United States Government. My recollection is that it was in the form of about a page of typewriting. I don't remember any other paper, writing or document, and my recollection is that Mr. Worley told me he couldn't find any other. Mr. Worley is a very talented civil engineer, is experienced in matters of bridges, though he is not by profession a specialist in bridge engineering. I recollect, however, that his opinion was confirmed to me by Mr. Franklin M. Hill, a specialist in bridge engi-

neering.

I should expect the critical speed would have the greater effect on the stringers and girders than upon the floor beams; while I cannot tell you definitely why I think so, that would be my opinion. Impact is greater when simple locomotives are used than when compound locomotives are used, because of the better balancing of the compound locomotives. Vibrations are cumulative in both, but the cumulation would be greater in the simple engine because of the greater variation in comparative thrust communication to the parts of the locomotive at separate points of time. By thrust, I mean the power applied to the piston and communicated from the piston rod, or communicated by the piston rod, to the connecting rod, or communicated by the connecting rod-here I mean the main

rod-to the wheels and the side rod. I think rough and flat 1297 wheels are noticeable on floor beams and truss members, and that the effect would be greater upon the floor beams. Floor beams are more closely related to the point of impact on the rail than on the trusses, and the effect would be considerably absorbed before it

reached the trusses.

It is generally considered by engineers that excessive elevation on curves increases resistance and makes the load harder to pull. The coning of the wheels that I spoke of, or that you spoke of, whichever it was, in respect of the travel of the wheels around the curves, wouldn't have the effect that you apparently said it would have, i. e. of equalizing the distance of travel of the wheels around the curve, because, if the outer rail is properly elevated upon the curve, the effect would be to reduce the curve to the conditions of a straight track and the wheels would run centralized between the rails, just as they did on a straight track. Now, then, as I understand it, the purpose of the coning of the wheels is not to equalize the distance of travel around the curve, but to cause the wheels to ride in such a manner that the flanges will remain at a little distance from the rails and not cut the rails heads, and if, as a matter of fact, the passage of a freight train around a curve was at a slower speed than the passage

of a passenger train around that curve, the effect of coning would be to produce exactly the contrary effect from that which would seem to be intended, if they were intended to equalize the distance of travel around a curve.

Furthermore, I have produced and examined a copy of the Master Car Builders' rules since adjournment yesterday, for the purpose of ascertaining the limits of wear under which the Master Car Builders'

require the wheels to be changed, and I find that the limits of 1298 wear do not take place when the coning is ground off and the wheel becomes cylindrical, but considerably later, i. e., when th cone has become reversed. I am still of the opinion that the wheels have to slip around every curve, one or the other, or both of them, in one or the other or both directions.

Q. Do not slow, heavy trains around curves, where the outer rail is elevated, tend to increase the elevation of the track because of the

lightening of the pressure on the outer rail?

A. The tendency from the cause which you have mentioned alone would be that which you have said, but there is another tendency, namely, the tendency of the wheel to continue upon the tangent, which tends to cause the wheels to climb up to the outer rail. That varies with the speed, but more with the character of the equipment—the readiness with which the trucks swing upon their king pins. Thus, in freight equipment, where the wheels do not turn as readily as on passenger equipment, there is a greater tendency for the trucks to ride upon the outer rail, and the wear, as a matter of fact, is found to be much greater on the outer than upon the inner rail. Therefore, it would be my judgment that the tendency of the heavy train to depress the inner rail would be counteracted by the causes just mentioned.

Q. The Committee of Economies of Railway Location of the American Railway Engineering Association reported, among other things,

in 1913, to the Association as follows:

"In studying average maintenance expenses by divisions for a period of years on the large system previously mentioned, it appeared that the best unit of traffic measurement of the expense was what we will term the equivalent ton miles, the total equivalent ton miles would be the sum of the following: double the freight locomotive mileage, times average weight per locomotives; four times the passenger locomotive mileage times average weight, total freight ton miles, (car and contents), double the passenger ton miles, (car and contents). This unit considers that one ton of passenger car does double the injury of

one ton of freight car and that one ton of locomotive affects

1299 the track as much as two tons of the train back of the locomotive. This unit of measurement even, best fits the increase
of maintenance of buildings due to increase of traffic and consequent

of maintenance of buildings due to increase of traffic and consequent increase in number and size of buildings. Passenger traffic demands a higher type and better grade of maintenance than freight and even a better type of shop buildings for repair."

Assume that that report was made, I want to ask you whether or not

you agree with the statements therein made?

A. The statements therein made refer to the particular railroad

under examination, and I should judge from what was said that that was a railroad on which very high-speed passenger trains were operated. It is my judgment that in the case of such a road there is a very considerable amount of expenditure for maintenance that has to do with the comfort of passengers under those high speeds, and I think that, if the circumstances are such as I have related, the report of the eminent engineers in the case would have great weight in the case to which they refer, but I understood counsel to say that it referred to the case of a particular railroad which was under examination, and not to a road like the South Shore, on which speeds are comparatively slow.

I don't think that critical speed, so-called, may be as low as 27 miles an hour, as a practical matter, on the South Shore. The term "critical speed" is that speed at which the increasong injury due to elements attendant upon speed would begin to be marked—that speed at which, in a general sense, the elastic limit of the track structure as a whole would be reached. It is my opinion that on this road that limit will not be found under somewhere from 30 to 40 miles. It would be found on some of the passenger trains which made a higher speed than 27 miles an hour and are included in the average, but, also, it is

a fact that freight trains on this road, particularly on descending grades, make speeds comparable with the higher speeds of passenger trains.

I don't think that the greater cumulative vibration and greater impact would be found with the passenger engines, which average the 27 miles, rather than the freight engines which average 16 miles, because I think the cumulation of the impact would be found where there are many wheel impacts, as in the case of a long train, and freight trains are much longer than passenger trains. Critical sped may occur at any place on the track, in the sense that I have stated. In this sense, I think it would frequently occur with the freight trains on this road where there were no bridges or other openings in the embankments; I think more frequently on the passenger trains.

Cumulative vibration takes place on straight embankments, either level or uphill or downhill embankments. The vibration is of a part of the entire track structure together with the depression of the entire track structure caused by the passage of the train.

The heavy engine depresses the track structure so that even on a level track the engine is running uphill all the time, just like a man walking a slack rope, only lesser in degree. Right in front of the driving wheels, taking the weight, you always have the incline immediately due to weight. The springing back of the track, the rails and the part immediately below it, is a process that takes some time. It springs back in the major part quite quickly, and the remaining restoration takes a good deal longer, and where the train is long, and there are a number of wheel impacts, the effect becomes cumulative; that is to say, the succeeding wheels continue to

strike the depressed portion, before it has risen. The impact is increased by reason of the rise in rails immediately ahead of the greater weight of the locomotive. In that connection, while the speed is greater the depression is less; therefore the effect

that you (Butler) have compared to going uphill is less at high than

at slow speeds,

Greater speed, or increased speed, tends to lessen this impact, because it doesn't settle so much as in the static load. In respect of that particular subdivision of impact, the greater speed lessens the effect. That is why the trains running at very high sped were determined in Germany to be supportable by a lighter track structure than the trains running at lower speeds. It is not the practice anywhere to have lighter structures for fast trains than you would have for the same trains if they went slow. I think that the fact is that the heavier structures are built to sustain the heavier weight of in-

I think that speed is a factor, but I don't think that the practice of increasing the strength of bridges and the weight of rails has been occasioned by increases in speed. On the contrary, as a matter of common information and general knowledge, such increases in strength have been due to increases in train loads, and the increases in speed during recent years have not, as it were existed, i. e., the trains ran as fast 40 years ago as they do today, but they were not as heavy; it is the heavier trains that require the strengthening of tracks, the increased amounts of ballast, heavier rails and stronger bridges. Other things being equal, I would expect a structure to be strengthened as the speed increases up the "critical" point, used in the correct engineering sense of the term. Counsel will doubtless perceive that such critical point having been arrived at, the lighter structure would then be equally safe.

1302 Thompson.

Redirect examination.

By Mr. Wykes:

The reason I merely substracted the delays from the freight train time, and did not add it to the passenger train time, was that I conceived that the deduction of the delays for the freight trains ought to put the freight trains in the same position that they would have been in if they had not been delayed for passenger trains at all. Also, there were delays to passenger trains caused by freight trains that I might have taken into my computation to the disadvantage of the

plaintiff but I did not do so.

That computation I made for Mr. Butler, which the time deducted from the freight trains would bear to the time of the passenger trains if added, was a mere mathematical computation that I made at his direction. I did not intend to have it appear that an addition of about 7% that I computed for him, to the passenger ratio of 30.32%, would produce the correct result; I have during the recess computed the percentage on Ratio 4 that should be used in case it is held that the delay caused to freight trains meeting passenger trains should be treated as a subject of addition to time of passenger trains, and I find that in that case, where my original percentages under Ratio 4 were, passenger 30.32% and freight 69.68%, the recomputed ratios would be, passenger 31.03% and

freight 68.97%. I obtained these figures by adding to the sum total of the elapsed minutes for passenger trains the amount de-

ducted for delays of freight trains.

In making comparisons of operating ratios in the passenger department, it is necessary to know, before any comparison can be made which will be valuable, what distance above the normal operat-

ing ratio, or a correct operating ratio, the rates of fare or the 1303 revenue would be. If the operating ratio were 50% under rates of fare of 3 cents, that would be the equivalent of an operating ratio of 75% under rates of fare of two cents, and 65%

substituting 2.6¢ for the 3 cents.

I was first engaged by the State in this proceeding in the spring of 1913, before the decision in the Minnesota Rate Case. I completed my report to testify before July 22nd, 1913, and appeared at Chicago for the purpose of testifying at that time. The Minnesota Rate Case having been decided at about that time, my testimony was put over from that time to sometime very much later, due to the changes made in the method of proof by the Minnesota Rate Case. From the time in July, 1913, that I was ready to testify, I have given very little attention to detail figures contained in the re-I have given attention, for the specific purpose of testifying, to the principles underlying my computations. At the time when I was to have testified originally, before the changes were made by the Minnesota Rate Case, I was intimately familiar with all of these detail- of figures. I did not think necessary to prepare in the same detail upon particulars that I had before, and confined myself to principles. I was familiar with the details at that time through my connection with their compilation, and I think I should continue to remain familiar with them if it had not been for the sickness spoken of; to get it up after that, would have required me to study over again the small details, and I have not had the time and strength to do it.

In the Mountain Ice Case, some of the principal divisions between passenger and freight were made on a revenue train mile basis. That basis is different from the basis which I used in this case. I

used the revenue train mile basis in that case for these reasons: First, I had only a very short time allowed me in which to 1304 get up my figures in the Mountain Ice Case, namely, about three weeks, second, the records of the Lackawanna were not such as to allow me to discover the gross ton miles, and although I attempted to find it out, I had to give it up; third, that was the first time I had attempted to make a separation, and I was not familiar with the subject as I have since become, and I did the best I could, at that time, according to the light I then had.

I did not look up or refer to what was done by anybody else in I had no opportunity to. And my use of the train mile basis there followed the old, and what I think might properly be called the extinct, use of the train mile basis. I do not think it is now used in general, except for the purpose of statistical comparison

one year with another on the same road.

I started to give the reasons why I had used the revenue train mile basis in the Mountain Ice Case, in certain particulars. I used it because it was convenient and readily available, because I could not get figures which would have been more nearly responsive to the facts, and because I then was not very familiar with the subject, and the art at that time was in a very rudimentary state compared to that to which it has since advanced. The Mountain Ice Case was heard

before Judge Prouty, of the I. C. C., in 1908.

I think the methods I have used in this case would be much more proper, but I think there were some of the methods I have used in this case that would not be equally applicable to the Lackawanna under its different conditions; i. e., to make a similar showing for the Lackawanna, I would not follow the methods I did before. I would follow a method much more near that I followed in this

Q. Mr. Butler discussed with you at some length the prop-1305 osition of adding the switching mileage to the revenue train mileage, on the freight side (both sides), in making divisions, and you stated that you thought that would reduce the element of error in the use of the revenue train mileage basis for division of common expenses. Do you remember who, in divisions of common expenses, ever used the revenue train mileage in that way with the addition of the switching mileage to freight?

A. The computations made by Price, Waterhouse & Co. include switching mileage with revenue mileage, and it is my recollection that Mr. Muller's computations do likewise in respect of some of the accounts, and I think also, speaking from memory, Mr. Worthing-

ton's do in some places.

On a number of occasions in my testimony I have referred to the question of accuracy permitted by the accounting records of the The compilation of the set of records of the expenses of a railroad involves the constant application of the judgment of the accounting officers as to the accounts to which the items shall be charged and while there are provided rules to govern the accountants, nevertheless, there is necessarily a very considerable measure of judgment of the accountant required to be applied to the items. In so far as that judgment is correct or incorrect, so does the result produced by the accountant vary from correctness in respect of what he sets up to the accounts that he produces.

Q. You answered with regard to the question of whether your results were approximately accurate, and I think had some difficulty in getting to the point of saying that they were substantially or ap-What was it that induced that uncertainty proximately accurate.

in your mind?

A. There were a number of things; the principal one was 1306 the lack of perfection of the records, when considered as records, for the purpose of making such a computation, and the lack of existing knowledge in the minds of any one or on the record anywhere as to the relative proportion of waste attributable to mechanical wear and weather stress in respect of various things, Further if the records of the plaintiff charge against operating expenses any considerable amount spent for capital purposes, it would be included in my figures as cost of operation. I was cognizant of the fact that there had been two appraisals of the property of this railroad made by Mr. Riggs, one about 1900 and the other about 1912 or thereabouts, and that the difference in costs of reproduction found by Mr. Riggs was very great, and that it was greater than the difference in unit costs which he applied against the items, and that this difference was not accounted for by capital charges on the books, and the necessary conclusions would be that the road had been improved at the charge of operating expenses.

I think that the correction of such errors as there may be in my work would result in decreasing the cost of intrastate passengers transported in Michigan, rather than to the increasing of it. By that I mean to say, the true resulting cost would be less than my

figures rather than more.

When I mentioned a 10% range of error as being substantially accurate, I meant 5% either way from correct, a total of 10% margin of error or variation; I think my results would not be more than 5% above or 5% below the truth. If there were no greater variation than 5% from correctness, there would be substantial ac-

curacy.

1307 I see no relation between the revenue train mile made on the Western Division and the cost of repairing a bridge on the Marquette division, or between a flagman stationed at a crossing in Marquette and a revenue train mile made on the line near St. Ignace. The flagmen are located in the yards in the centers, such as Marquette and other considerable towns on the line, more largely than in the country. The switching and train movements occur most frequently in those same yards.

THOMPSON.

Recross-examination.

By Mr. Cotton:

In the Lackawanna Mountain Ice Case, one of the reasons why I adopted the revenue train mile basis was that I only had about three weeks in which to prepare for examination. In stating them, I did not mean that was the most important. I cannot say that at that

time the revenue train mile was universally used.

I took 2.75% of delay to freight trains out of the time of occupancy by these trains. I did it on the theory, as I have stated, a little while ago, that the deduction of the amount of time from the freight train time, to put the freight trains in the position that they would have been if there were no passenger trains to oppose them. It would have gotten to the terminal that much quicker.

Q. If it were lying on the freight track to the extent of 2.75%, that time, if it had not been for that delay, it would have utilized in its occupancy of the track, would it not, the main tracks, in get-

ting to the terminal?

A. It would have utilized that time, and so much less at the end would have been required, so the elapsed time be-

tween terminals would have been the total elapsed time minus the

delay, just as computed.

I do not think that 2.75% must be added to the time of occupancy of the passenger trains in order to have exact equality; it seemed to me that that was a point on which I might be overruled and therefore I computed the difference in per cents and stated them this afternoon, showing that the passenger percentage would rise from 30.32% to 31.03% on the time ratio, and that the freight percentage would fall from 69.68% to 68.97%. The difference would not make very material variation in the results.

Q. As a matter of fact, you were complimented by the Commission on the work that you did in this Lackawanna case, for accuracy and correctness in your divisions of this common expense; is that

true?

A. I was complimented by Judge Prouty of the Commission for the care in which I did my work and particularly for the conscientiousness in respect of not endeavoring to make a result showing one way or the other.

Q. And that care and conscientiousness involved the use of the revenue train mile basis in a division of this common expense did

it not?

A. I cannot answer that yes or no without stating other considerations, known to the court, namely, the short time I had for preparation. I do not think that Commissioner Prouty meant to compliment me on the use of the train mile basis. My recollection is that Judge Prouty expressed some criticism of the train mile basis indicating it was more valuable for merely statistical purposes than for the truth of separations. I am stating that wholly on my memory, and would not swear that is true without consulting the record, but I think that is true.

Q. When Mr. Butler first brought this Mountain Ice Case to your attention, your memory of what you did there was so perfect that you could not recall what particular method or

basis you used at all, is not that true?

A. That is not true. I have seen lawyers read untruthfully from a printed statement, and I desired to guard myself against the possibility of Mr. Butler doing it. I do not mean to imply that I think Mr. Butler would, but I wanted to be sure he was not.

Q. But you have given the impression upon the record that you were not certain what method you did employ there until Mr. Butler

read from the brief the method that you employed?

A. I do not know what impression I gave on the record, I know that in my own mind I was not prepared to testify specifically, as to each and every item of 116 accounts, just the method I used 6 years

ago.

My second reason for using the revenue train mile basis in that case was that the records of the Lackawanna road were such as not to permit me to use any other basis. The records were not such as to make it possible, within any reasonable length of time, to compute or even estimate the gross ton mileage. Furthermore, there were complications in respect of the suburban passenger traffic, the correct

elimination of the error due to which, or the inference of which, would have taken a great deal of time and effort and for which the books of the Lackawanna were not so constructed as to yield the information. This was 1908, and the accounts examined were the accounts for the first year after the installation of the I. C. C. classification, under the Hepburn Act. At that time, there was great difficulty in that, do the best they might to make their accounts conform

to the new classifications; there were a number of differences 1310 which I cannot relate, but they were in general attempting

to conform to the classification.

In making the statement, that one of the reasons why I used the revenue train mile basis then and swore to it as a proper method of divisions was because the records of the Lackawanna road were not kept as they should be, I had no reference whatsoever, and I think counsel knows it well, to the question as to whether the records of the Lackawanna conformed to the records or requirements of the I. C. C.; it has nothing to do with the case at all in respect of my answer. I would like to say that the classification of accounts for Additions and Betterments was in an imperfect state during the first year after the installation of the new system of accounts, and that is why I thought that the accounts, Maintenance of Way and Equipment, might not have been quite correct.

Assuming the Lackawanna accounts did follow the I. C. C. classification, my answer would still be that the accounts did not afford the information I needed. I do not think there would have been any differences between the accounts of the Lackawanna at that time and the South Shore at that time (1908). The accounting departments had the same troubles. I think the accounts of either road during that year and the present time, being compared, it would be found that the accounts at the present time are kept more directly responsive to the requirements of the Interstate Commerce Commission. It was impossible to make all of those changes accurately at

once on the short notice that the gentlemen had.

My third reason for using that method was because it was my first attempt at separation of common items of expense between passenger and freight. I believe this is the third time I have tried it.

the Minnesota litigation. When I made that division and swore to it, I thought it was as nearly correct as the accounts made it possible to get at the truth. I do not think it was a pretty close approximation, in view of my subsequent knowledge. I think I got the result too low. If I did it over again, I would find it cost more to transport ice. I did not look up what other engineers and experts and accountants were doing in the matter. I had no time to do it; I was given 3 weeks to complete my compilation.

Price, Waterhour & Company, in the employ of the New York, New Haven and Hartford, about 3 years ago, in the Railway Mail Pay inquiry, divided account 2, Ballast, on the revenue train mileage basis including switching; also accounts 3, Ties, 4, Rails, 5, Other Track Material, 6, Roadway and Track, 7, Removal of Snow, Sand and Ice, 8, Tunnels, 9, Bridges, Trestles and Culverts, 10, Over and

Under Grade Crossings, 11, Grade Crossings, Fences, Cattle Guards and Signs, 12, Snow and Sand Fences and Snowsheds, and 13, Signals and Interlocking Plants. The statement which I have before me describes Price, Waterhouse & Co.'s method: "Direct where possible and apportioned on the basis of suitable relative ratios and on

the ratio of assigned items."

Mr. Muller used a ratio that involved the same basis of revenue train miles. His description of his ratio used for account 2, Ballast, is: "One half on locomotive miles including switching. One half being the remainder half and likewise in respect of its ties, rails, and other track material and of roadway and track, of tunnels, bridges and trestles and culverts, and perhaps some others."

Q. Am I right in saying whether the principal factor in what you have just read would not be simply a method of the reve-

1312 nue train mile bases after all?

A. Yes, but I think the modification would be very material and that it would be almost all on the side of increasing the freight revenue train mileage, and not the passenger revenue train mileage. I base that on my general knowledge of the fact that the amount of switching done in the freight business is enormously greater than that done in the passenger business everywhere. Mr. Peabody, Statistician of the Santa Fe, has used the revenue train mile basis on some of the common items.

Q. Now at the time that you were doing this work in the Mountain Ice Case, the consensus of opinion among the very best engineers competent to do this sort of work was that the revenue train mile basis, everything considered, was the best and most practical an tefficient method to be employed in the division of these common items

of expense, Maintenance of Way and Structures?

A. I do not believe that; I do not believe there was any consensus of opinion. I do not think the competent accountants and engineers generally had considered the subject carefully with intent to arrive at correct result. To answer as to the Pennsylvania or the New Haven, or any other road, I believe that it is not a suitable basis for any of them. It might follow out that its results would in isolated cases coincide with the results of a correct computation, but I think that would be a mere arithmetical accident and have nothing to do with the correctness of the method.

Q. But you would expect the officers and engineers of the Pennsylvania Railroad to be pretty competent and pretty well experienced

in matters of this sort, would you not?

A. Well, I am going to answer you as well as I can; that is not a question I can answer yes or no. My answer to that is that my opinion of the men would depend upon my notion of what the Pennsylvania Railroad was trying to use those figures for.

Q. Don't you know, as a matter of fact, they have used this

revenue train mile basis for many years?

A. Yes, I do. I, further, have been told by representatives of the Pennsylvania Railroad that they do not think it was of any value. I wish to say though, Mr. Counsellor, while I have no intent and

do not wish to introduce or endeavor to bring into my testimony hearsay as testimony, it is true that those things affect my own judgment when I am told them by other people.

Q. Did I understand you to say in your re-direct examination that, if you were to add the switching mileage in this case to your revenue train mile basis, it would reduce any factor of error that you

thought there was in the ratio almost to a minimum?

A. No sir, what I intended to say was, not referring to my computation at all, but referring to computations introduced by the complainant, that if the basis of division used by complainant, namely, revenue train miles, were amended, and in its place there were used a basis of division obtained by adding to the revenue miles the switching miles, then I thought that the amount of error contained in the complainant's computations would be reduced.

I admit, and have admitted, and continue to admit unhesitatingly, the elements of imperfection in my computation here because of the imperfection of the records of the railroad. That same imperfection

exists as to all railroads in the country generally. The inter
1314 passenger service in Michigan is in fact and in truth more
expensive than the intra, undoubtedly to the extent that it is
more expensive to handle the accounting for interline passengers
than it is to handle the accounting for line passenger business, and
we know the larger part of the interstate business is interline relatively than of the intrastate. The lack of information on this subject produced an element of error.

When I say I have not taken this into account, by that is meant I have not loaded the cost of intrastate (inter) business with that item. I do not concede that the intra passenger business on this road in Michigan is more expensive than any other passenger business—that is, than the inter passenger business. I would say, in respect of some of the items it is more expensive, and in respect of some other items it is not, but as to the total amount I am not prepared to say whether it is or is not.

THOMPSON.

Redirect examination.

By Mr. Wykes:

I did not find any record of the South Shore which kept the revenue train mileage by divisions, or by other divisions or sections of the road than the whole. If that basis were to be used, it would be valuable to have the revenue train mile by divisions, as it would diminish the error to segregate the expenses so far as possible into divisions and use the train mile ratio against the division. I did not find any record of the cost of maintaining exclusive freight tracks on the South Shore; what I mean by that is, I found an accumulation of records that could be referred to. There are records of individual

expenditures, item by item, that have gone on these exclusive freight tracks, but they have been merged in the compilation with the other. I found no total separate from the total of

the whole road for a similar item.

I did not find any record of revenue train mileage on the exclusive freight tracks, no detail of the switching movement which took place in the first hour at particular places and the reduction of that to miles, nor any record of the switching movement of passenger train cars or of freight train cars separately, nor any separation of the cost of interchange carload lots or less than carload lots, either or both, with other roads. There are none of these things that it would not be material to know if I were making precise separations.

Q. Where any so-called allocation depends upon the use of arbitrary figures, such as locomotive miles or train miles, or features of

that character, would you term that an allocation?

A. No sir, that is not an allocation at all; it is a misuse of the

term; it is an assignment by computation.

Q. Now getting a little closer to it. Such items as lubricants for road locomotives, assigned on the basis of the fuel for road locomotives, would you term that an allocation or assignment?

A. I would term it a computed assignment.

Q. Take where an item such as fuel, so far as it was common or used in a locomotive in the common service for the time being, and being assigned on the relative mileage in each of the two services, would you term that an allocation?

A. No sir, that is not an allocation; it is a computed assignment

like unto other computed assignments.

Q. Is the revenue train mileage basis reliable and accurate for statistical purposes, for comparing the operations or happenings in passenger department in one year against the similar operations or happenings in the passenger department for

another year?

A. Under some circumstances it is; what I mean by that is that if the conditions remained relatively unchanged the train mileage basis division becomes an informative statistical method for telling the management what is going on relatively this year with what went on last year, but it becomes unreliable even for that purpose when the flow of traffic or the conditions of traffic on the system does change between one year and another.

Q. Where it is reliable, that is, where conditions remain practically the same with no abnormal changes, is that because it is the con-

parison of likes?

A. Yes. The value is to show whether the like expenses, for instance, in the passenger department or in the freight department

one year with another, have changed.

Q. Now, is its use by railroad companies for statistical purposes for such comparison any argument for its use in a comparison of unlikes, such as the freight and passenger sides?

A. Absolutely none whatever.

Q. Can you find the Buell case (1 Wis. C. R. 101-102), — which Mr. Butler referred in the examination today, where he stated the claim of the railroad companies in that case to have been that the passenger mile was more expensive than the freight train mile? Do you find there a table which contains an examination of statistics

for maintenance of way and for other costs for different railroads?

I ask you to read the table.

speed was relatively more injurious to the rail and track than weight; or, which is possibly more accurate, to give consideration to both speed and tonnage. It is quite intricate and when applied allots an unduly large proportion of the expenses to the passenger traffic. It appears to be at variance with most other theories of apportionment and with a common sense view of the situation. The formula was submitted for examination to Prof. W. D. Pense of the engineering department of the University of Wisconsin. In his report upon this examination Prof. Pense criticises the formula itself as well as the basis upon which it rests. He also offers some general observations based upon experience or actual tests which, in substance, show that speed is not relatively more injurious to rail and track than weight if as much so. Some of his observations are:

"The wear of the wheel tread is a good basis for estimating the

wear of rails.

"The wear of drivers is more rapid on freight than on passenger

locomotives.

"The wear of drivers on passenger lcomotives is not increased as speed increased.

"Hammer blow of drivers is frequently more injurious to rails

with freight service than with passenger.

"Passenger rolling stock is less severe on the track and structures

than freight cars.

"Rail defections and roadled pressures do not increase directly as

the speed.

"Cost of raising and tamping track is not increased with

1318 increased proportion of passenger trains.

"The renewals are chiefly due to decay.

"These are substantially the conclusions at which Prof. Pense arrived. They are based on such experiments and observed facts in relation to this matter as have been made and published and it is

felt that they are entitled to a great deal of consideration.

"If the passenger trains caused relatively so much more damage to the rails and track than the freight trains as the Company would have us believe, then the cost of maintenance of way should be relatively greater on those roads where the passenger traffic predominates than on those where the freight traffic is the heaviest. Yet this is not the case as the following table demonstrates."

Cost in Cents per Revenue Train Mile.

	No. of years in-	Repairs of roadway.	Renewal of rails.	Renewal of ties.	Total roadway, rails, and ties.	renewal of bridges and culverts.	ralls, ties, bridges, and culverts.	Mainten- ance of way and structures.	per cent of total revenue train mile.
one Island	1-	9.07	8	1.90	11.74	1.37	13.11	17.20	88.42
Vork New Haven & Hartford	1 13	12.16	1.17	2.56	15.80	2.49	18.38	24.68	67.10
A Maine	14	11.32	8.	2.51	14.75	1.88	16.63	20.30	50.14
lew York Cent. & Hudson Rive	111	10.67	1.26	2.55	14.48	1.73	16.21	19.96	51.90
are. Lackawanna & Wester	9 "	12.82	1.40	2.83	17.15	4.60	21.75	31.34	46.38
ine & Lake Prie	10	11.81	2.68	4.16	18.05	2.50	21.15	24.61	37.71
bleago, Milwankee & St. Paul.	14	10.02	2.55	3.35	15.86	3.37	19.23	25.46	36.53
Valley	1-	14.65	1.62	4.50	20.77	3.50	24.27	30.10	36.40
k & Western	6	11.65	55.80 0.80	3,06	17.51	3,35	20.86	23.30	26.79
h & Iron Range	9	31.08	3.51	3,43	38.62	2.45	41.07	63.18	15.40
Duluth, Missaha & Northern	9	32.58	10.47	6.28	49.33	8.15	57.48	86.40	12.33

Shore in periods ten years apart? Now, if it should be the fact that in addition to the two appraisals ten years apart there were two appraisals one of which was one of the two that you have referred to, two years apart, and than an analysis of the results of those two appraisals, a reconciliation and a reduction of the items to the same items in each appraisal were made which indicated (on the same prices and on the same inventory each time, the inventory containing such general items as the right of way, roadway and track, and track structure and so on, in different items) there had been an inrecase of \$300,000 in the two years, this all being over and above additions and betterments, would that indicate that there might be an error in your result to the effect or in the way of your results being stated too high in cost?

A. Yes.

I find that the average haul of intrastate passengers in this case is shown to be something under forty miles. That indicates to me that the vast bulk of intrastate passengers are short-haul passengers and have no use for sleepers and diners, and I do not think they should be charged with the expense of maintaining the hauling of sleepers and diners. I think the long-haul passengers should do it, and I think, whether the long-haul passenger is intrastate passenger or interstate passenger, he should pay for the service which he gets and the other fellow does not get.

I think if a man who used the sleeper paid the full value for his service, over and above the mere transportation, then the cost accounts should be kept separate. I am not criticising the management in respect of maintaining the service, but criticise the ap-

portionment of the cost of that service against the pure cost

1321 of transportation.

I mean, in showing the cost of carrying passengers as such, what railroads call transportation, as separate from Pullman, for instance, and in showing the cost of transportation as such, I think we ought to show the cost separate, and that the cost of the special hotel facilities should be paid for by the people who avail themselves of them. Assuming the entire sleeper and diner service of the South Shore were on the Houghton Branch, there would not be any justification or any reason for charging any part of that sleeper and diner against the passenger traveling on the other parts of the line, where there was no such service. I think there is no greater warrant for charging any part of that service against the short-haul passenger who does not use it than there would be in charging it if it were carried on only a part of the line against the other parts of the line.

THOMPSON.

Recross-examination.

By Mr. Eldredge:

Q. Mr. Wykes had you figure out certain percentages on a basis of 2.6 cents per mile passenger charge and 2 cents passenger charge, and they were, as I take it, what Mr. Wykes assumed and you assumed to be the proper percentages, which Mr. Butler should have used in certain questions that he put to you this morning, where he used the percentage- of 44.7 and 57.7. Had those percentages which Mr. Wykes had you figure been used by Mr. Butler in his questions, where he used the 44.7 and 57.7 percentages, your answer to Mr.

Butler would have been the same?

A. I take it you are now inquiring as to Mr. Butler's final hypothetical question, in which he put in all the assumptions and enlarged his question and made no qualifications. There is a difference between his questions. He asked a series of questions in which he did not assume all the assumptions, and then he asked one question which was confined entirely to assumptions and that question I answered "Yes," without any attempt to qualify it, and I did so because it seemed to me the fact that these eastern roads were operating generally on two-cent fares or less and your road was operating on three cent fare, it was so obvious it was the only answer for me, and I answered yes.

Q. The questions of Mr. Butler to which I refer are those which he asked you in reference to results obtained by certain eastern roads which he named on quoting from Mr. Brandeis' argument to the Interstate Commerce Commission. You understand those are the questions.

tions I refer to?

A. Yes, I understand that.

Q. Now, if Mr. Butler, instead of the percentages which he used in those questions, had used the percentages which Mr. Wykes had you figure here and to which I have referred, your answer to Mr. Butler would have been the same?

A. I will answer yes, now, because, as I understand it, I should answer yes, and if I find any reason to modify it I will do so, and give

my reasons.

Mr. Wykes: One thing further that may clear this up a little: Just generally, and assuming the average rate of income for passenger to be 2.6 cents per mile traveled and the operating ratio for passengers

found on that to be 57.7, call it 58 for convenience, what would be the operating ratio on the basis of a revenue reduced to two cents?

A. Approximately 751/2 per cent.

(It is agreed that the tabulations which appear on record pages 9860 to 9881, from Thompson's Appendix A, may be marked Defts.' Ex. 72a and filed with the clerk and returned as an exhibit.)

UNITED STATES OF AMERICA, Eastern District of Michigan, ss:

I, Elmer W. Voorheis, Clerk of the District Court of the United States for the Eastern District of Michigan, do hereby certify that the above and foregoing is a true copy of Volume 3 of Narrative Statement of Testimony on Appeal comprising typewritten pages numbered eight hundred and ninety-three to one thousand three hundred and twenty-three inclusive, in the therein entitled cause as the same appears on file and of record in my office; that I have compared the same with the original, and it is a true and correct transcript therefrom and of the whole thereof.

In testimony whereof, I have hereunto set my hand and affixed the seal of said Court, at Detroit, in said district, this twenty-first day of November, in the year of our Lord one thousand nine hundred and eighteen, and of the Independence of the United States of America the one hundred and forty-third.

[Seal of the U. S. District Court, Eastern District of Mich.]

ELMER W. VOORHEIS, Clerk.

1324

Vol. 4.

On June 4, 1914.

AUGUSTUS C. HONE, a witness called by defendant.

This witness, an engineer on the staff of M. W. Thompson, had charge of making the computations entering into Defts.' Ex. 72, Thompson. He testified to the correctness of the computations, and that the method outlined by Thompson, and in Defts.' Ex. 72, Thompson, had been carefully carried out and checked, and every effort to secure accuracy followed, that there was no attempt to go back of Mr. Delf's records, and that the totals used were taken from plaintiff's records, with one or two exceptions. The exceptions were for the purpose of using averages to normalize unusual expenditures, as in ballast. The detailed sheets of the computation show all such variations, and the methods pursued.

1325

On June 5, 1914,

Albert R. Dilley, a witness called by defendants.

Direct examination.

By Mr. Wykes:

(Mr. Wykes produced a chart, marked Defts.' Ex. 99 (should be 71), Dilley, June 2, 1914.)

I have compared that chart with the stipulation between Mr. Eldredge and myself, and I have underlined in the chart all of the things which are taken from or which are contained in the stipulation.

Mr. Wykes: The stipulation is to govern, and there is nothing intended to be in the chart that is not in, and a part of, the stipulation.

1326

On June 25, 1914.

ROLLAND C. ALLEN, a witness called by defendants.

Direct examination.

By Mr. Wykes:

I have been employed for five years as State Geologist of Michigan. Previously was instructor in Geology in University of Michigan, one year; was connected with Michigan State Geological Department for a short time, before appointment as State Geologist. I was a year ago last January appointed by the State Tax Commissioners as appraiser of Michigan mines. Since, I have made two complete ap-

praisals of the iron mines and one of the coal mines in Michigan. was necessary for me to locate the ore formation and ore bodies in the

Upper Peninsula.

As expert for Tax Commission, the records which come to my office are variable in character. Each mining company, operator or owner of an iron mine, is required to submit to the Board of State Tax Commissioners maps showing all of their underground workings-records of their drillings and other explorations. by me in appraising these properties for taxation. In addition, I use a vast fund of other information, accumulated by geologists for many years in the mining regions.

The ore formations in Upper Peninsula are indicated by the geological surveys of the Federal Government and of Michigan, and by the work of individual geologists. In certain localities, the information regarding the existence of iron ore in formations is so precise and complete that we can make definite statements regarding its presence or absence, but for a large part of the area known to be underlaid by

ore bearing formation we are unable to state definitely the 1327 presence or absence of commercial iron ore. The presence of a known ore bearing formation indicates possibility of occurrence of commercial bodies of ore, until exploration and geologic research proves the contrary.

The reports submitted to me contain records of the drillings and explorations made by mining companies in the iron ore district around Ishpeming and Negaunee. These reports are verified, on oath of the makers, and by personal examinations of myself and assistants where possible.

I am familiar with the line of the South Shore as it leaves Marquette, runs westerly through Ishpeming, Negaunee, Champion and Michigamme. I know the location of the line and the sections and

subdivisions crossed.

This (Defts.' Ex. 73, Allen) is a map of the D.S.S.&A. in two parts, the first part from mile post 163 to mile post 173 and the second part from mile post 178 to mile post 198. This map shows not only location of main lines of D. S. S. & A., but also the geology of the adjacent country on either side of the track, and particularly the area underlain by the iron bearing formations of the Marquette Range, and in that formation the location of known bodies of ore, and the location of drill holes which have penetrated iron ore, showing the depth at which iron ore was penetrated and its thickness in each hole which encountered iron ore. It does not show drillings where no ore was encountered, except such as are immediately adjacent to D. S. S. & eks. The holes which penetrated ore are indicated by red circles, and thickness of ore by red figures. Other figures in A. tracks.

1328 black show depths at which iron ore is encountered. known ore bodies are enclosed on the map, in dashed red lines, inside which is shown the position, depth and areas of the bottom working levels of mines operating. I have omitted from the map ore bodies a considerable distance from plaintiff's tracks.

The only known ore under main line tracks of plaintiff's on the Marquette Range is that of the Cliff shaft mine, crossed by the road near mile post 170, in Negaunee. In making my map, I excluded those lines engaged exclusively in ore business, and confined myself to main lines used in passenger business. The ore body adjacent to mile post 170 has been, and is now being, worked under plaintiff's tracks. From Marquette to mile post 165, plaintiff's right of way crosses rocks in which there are no known possibilities for

the occurrence of iron ore.

At mile post 165, the road encounters the iron bearing formation, and to mile post 1691/4, except for a very short distance, in sections 6 and 1, it runs across ore bearing formation. From mile post 1691/4 west to mile post 172, the main line crosses Goodrich quartite formation. This quartite overlies the Negaunee iron bearing formation and the workings of the Cliff shaft, Lake Superior hard ore, and Section 16 mines, adjacent to the tracks, have penetrated this quartzite into the ore bearing or Negaunee formation below

From mile post 165 to near mile post 166, the right of way is coincident with the crest of an anticline or arch in the Negaunee ore bearing formation. Such situations are in the Marquette range unfavorable to the occurrence of ore. I recall no occurrence of a commercial body of ore in such a situation on this range.

Therefore, we must conclude that, while the occurrence of ore under the right of way, mile post 165 to near mile post 166, is possible, the possibility is remote and not such as to lend any considerable value to the acreage of the right of way. As illustrating the position of the right of way, mile post 165 to mile post 166, with reference to the geologic structure in the iron bearing formation, the occurrence of the ore bodies in the synclines and the absence of them on the tops or crests of the arches or anticlines, I have drawn a cross-section along the line C, D which it appended to the map. That cross-section is approximately a mile and indicates a general law governing occurrences of ore bodies in the Marquette district. It is: Ore bodies in the Marquette district, speaking now of the soft ores which occur in this immediate vicinity-soft ore bodes show, by the known facts of their occurrence, a decided prefer-

The ore bodies in the Marquette district occur in rock, known as the ore bearing formation, which in the Marquette district varies from a few hundred feet up to 1,400 feet in thickness. A composite analysis of the entire formation would show a content of iron of not less than 25%. Commercial ore must, under present conditions average above 49% with the exception of certain siliceous grades, of which comparatively small tonnages are mined and used to mix with higher grades. If commercial ore must contain at least 49% iron, and the iron bearing formation as a whole contains on the average only 25% iron, it is apparent that the ore bodies are the richer

ence for synclines and almost a complete avoidance of anticlines or

parts of the iron bearing formation; these ore bodies were not 1330 present in the unaltered iron formation through which the

iron was more evenly distributed.

The iron bearing formation, as originally deposited, differed in many ways from is present condition. The important differences are: The iron bearing formation in original form was a rock containing iron and silica, with subordinate amounts of alumina, lime, magnesia, etc. The iron was in ferrous condition; i. e., the proportion of oxygen to iron in the ferrous condition is less than in the ferric condition. This rock, containing the above constitutents with the iron in ferrous condition, is the original or unaltered iron formation. Any chemical change in the constitution of this rock or its component minerals is a chemical alteration of the iron formation which has been a large factor in the concentration of ore bodies.

The iron formation at present is partly altered and partly unaltered. The unaltered parts of the iron formation are, in that part of the formation which is open to inspection, very subordinate to the altered parts, but in those isolated places where the natural conditions are such that alteration takes place with extreme difficulty or slowness, the iron formation is in an unaltered or relatively unaltered condition. The formation or ore bodies is a process of alteration, and represents one of the extreme phases of alteration through the action of underground waters, which operate to dissolve silica and oxidize the iron content of the formation from the ferrous to the ferric condition. Underground waters are the only known agents competent to affect, on a large scale, solution of silica and oxidation of iron. As this phase of alteration is accomplished by underground waters, it is a certain inference that the alteration will proceed most rapidly and to best effect in those parts

of the iron formation where the underground waters flow most freely or are concentrated in underground trunk chan-

nels of circulation.

Any geologic structure, therefore, which forms a natural trough with an impervious bottom, becomes a channel of underground water circulation. The synclines form, with their bottoms of slate or other impervious rocks, natural trunk channels or underground water circulation, and it is in these situations that the soft ore bodies are formed. These synclines exist by reason of the deformation by folding or compression, by mountain building forces, of the iron formation, and its associated upper and lower sedimentary formations. Following this deformation, the country has been reduced by erosion, so there are today exposed the stumps of ancient mountains, and the plane of erosion or surface of the ground today cuts across, indifferently, anticlines and synclines; so that these structures, which were once complete, are now cut across or sectioned by the plane of erosion, which is the ground's surface.

The above applies to the concentration of the soft ores of the Marquette range, and not to the hard ore bodies which occur in the top of the formation and characteristically just under or near contact

with the overlying Goodrich quartzite.

Figuratively speaking, the right of way in the vicinity of mile post 166 descends from the crest of the anticline, or arch, and cuts obliquely across the axis of the great Maas-Negaunee syncline or basin. The axis of the syncline may be taken as the central or median line, or a line coincident with the lowest point of the trough, running lengthwise of the syncline.

1332 In my opinion, the Maas-Negaunee trough or basin contains one of the greatest ore reserves in Michigan. The working of the Maas and Negaunee mines, and the numerous drill holes

west of these workings, or down the pitch of the trough, show that in all probability there is an almost, if not quite, continuous body of iron ore occupying all or nearly all of that part of the ore basin enclosed by the red dashed line on the map, which lies east of Healey Ave., in Negaunee. To my knowledge, there are no drill holes in this basin which penetrate ore at depth, west of Brown Ave., in Negaunee, until we reach the S. E. ¼ of N. E. ¼ of section 1, where, near the east central side of this description, ore occurs between 2,100 and 2,205 feet, and near the western side, and about 300 feet south of the former, ore is shown by a drill hole between the depths of

2,784 and 2,990 feet, and below.

Examination of the workings of the Maas and Negaunee mines. and of the records of drill holes in the Maas-Negaunee basin, shows clearly a westward pitching synclinal trough, which carries ore in the area above referred to, and presumably more or less continuously far-This trough is crossed ther west across section 6 and into section 1. obliquely by the D. S. S. & A. from near mile post 166 to about mile post 1671/2. No ore is known to exist in this trough under the right of way. It is my opinion that ore does exist under the right of way in some places and possibly for a considerable part of the entire distance The depth of this possible ore, as indicated by drilling and by the known structure of the Maas-Negaunee basin, will be from 600 feet, near mile post 166, gradually deepening to the west under the track, until in section 1, near a point 1,320 feet east of the center of the section, it becomes probably nowhere less than 2,000 feet.

1333 and probably 2,700 or 3,000 feet, in depth. It is possible that small bodies of ore may occur anywhere in the Negaunee formation within the limits of the Maas-Negaunee trough, but the great body of ore has been demonstrated to be in the bottom of the ore

bearing formation or trough.

It is difficult, if not impossible, to mine a large body of soft iron ore, particularly if above (less than) twelve to fifteen hundred feet, without material disturbance of the surface of the ground by caving. As the thickness of rock above the ore body increases, the disturbance of the surface, as a result of caving at great depths, becomes progressively less, as the breaking up of great thickness of cap rock creates an enormous number of small voids which operate to swell the volume of the caved rock; so a large cavity at great depth may be filled by eaving and breaking of the overlying cap rock without material disturbance of the surface.

Applying this to the question of what would happen to the D. S. S. & A. railroad were ore to be mined beneath it and the void permitted to fill by breaking and caving of the rock above it, it may be said that ore lying at great depth (2,000 feet or more) could be mined and the ground above permitted to cave without material disturbance of the surface; such disturbance or sinking of roadbed could easily be counterbalanced by filling as the subsidence progressed. The subsidence would be slow. I make this statement in respect to effect of caving from the knowledge gained from observation of re-

sults of caving in many iron mines throughout Michigan.

Beyond section 1, in Negaunee, west to mile post 170, there is to my

knowledge no known commercial ore bodies of any value be1334 neath or immediately adjacent to the plaintiff's right of way.

The road crosses underground workings of the Cliff shaft
mine in Ishpeming, near mile post 170, and ore occurs under the right
of way. The Cleveland Cliffs Iron Co. is mining hard ore at various
depths down to 987 feet, under Ishpeming, and are preventing caving
or movement, by leaving supporting pillars of approximately 30% of
the ore. Such mining wouldn't be possible with the same favorable
result in soft ore.

It is probably the fact though not certain, that an ore body extends across the right of way between approximately 10 and 30 rods west from mile post 170, in Ishpeming. This ore body lies at moderate depth, not greater than 250 to 360 feet, beneath the track. In my opinion, this ore can be mined, as in the Cliff shaft mine, without disturbing

the surface under or adjacent to the D. S. S. & A.

From about 40 rods west of the Cleveland shaft, mile post 170, west, there are no ore bodies known to lie beneath the main line of D. S. S. & A. There is a reasonable probability that some ore bodies do occur between mile posts 170 and 172, and, if they do, they may, in all reasonable probability be mined without disturbing the surface or caving the right of way of the railroad, as ores in this vicinity, and particularly in the top of the ore bearing formation at or near the contact with overlying quartzite, are hard, and may be mined by the room and pillar method, leaving sufficient ore to support the openings. This need not be over 30% of the ore. The Goodrich quartzite which underlies the right of way, mile post 169¼ to mile post

172, is a very hard, strong rock, capping the underlying ore bearing formation, thus rendering the supporting of openings in the ore bearing formations much easier than otherwise.

The hard ore is mined to a depth of 987 feet in the Cliff shaft mine, and approximately the same in the hard ore mines in sections 9 and 16.

Mile post 172 to mile post 190, near Michigamme station, the main track of plaintiff is underlain by rocks not known to contain iron ore. Within the Michigamme formation are local lenses or ferruginous rocks, and mining operations have been attempted on some of those ferruginous layers, but with uniform financial failure.

Near mile post 190, the main track crosses, for \(^3\)\% of a mile, the Negaunee iron bearing formation. Also, from mile post 192 to mile post 192\(^1\)\%, and from mile post 194\(^1\)\% to mile post 197\(^1\)\%, beyond which the track does not cross iron bearing rock. The ore bearing formation, mile post 190 to mile post 198, and beyond, is hard, siliccous and lean. While some ore has been mined at Michigamme and other locations on this belt of Negaunee formation, no mines are at present operating, and I know of no plans for operations on this belt. If commercial ore should be discovered here, it is probable, as in the hard ore area in the vicinity of Ishpeming, that openings could be made under the track for the purpose of extracting such ore without danger of disturbing the tracks.

Approximately parallel with the main track of the railroad, from mile post 188 to beyond mile post 198, and in two parallel belts, from section 32, town 47 north, 29 west, to the N. E. corner of section 21, town 48 north, 31 west, brings us to the Beaufort mine, a

is ore bearing, as at the Imperial, Portland and other mines west of Michigamme. The Bijiki schist lies entirely to the south of the D. S. S. & A., from mile post 198 to the vicinity of mile post 188, where the road turns to the southeast and crosses three belts of it; no ore is known to exist in the Bijiki schist in the vicinity of its crossing by the railroad. No ore has ever been mined or is known to occur in commercial quantities in this formation east of mile post 193. That portion of the Bijiki schist known to be ore bearing lies entirely south of the railroad, where mining can have no possible relation to the operation of the D. S. S. & A.* So far as I know, there are no iron ore formations under the track west of mile post 198.

The Champion mine lies south of mile post 187. I have shown the position of the 32nd or 1907 foot level on this map, which is the level nearest the main track; at that point it is hard ore formation. Except the Bijiki schist member, which is not the same as mined at the Champion mine, there is no ore bearing formation under the track at that point. The known ore does not extend under the main

line track within approximately a half a mile.

The lowest workings in the Champion mine (Ishpeming-Negaunee district) are approximately 2,300 feet. I would correct my statement, that the level shown on Defts.' Ex. 73, Allen, as the 1907 foot level is the working nearest the main line track, as the ore leans; the formation dips very steeply toward the track, and successive lower levels are slightly nearer the track. The lowest level at which min-

ing operations are being carried on in soft ore formation is about 1,400 feet, in the Hartford or Cambrai mines; the ore in most of these deposits somewhere comes to the rock surface

and is followed down.

The pitch or incline of the ore body, when followed down, may carry it beneath one thousand or two thousand feet of rock capping. That would correspond with the pitch of the ore bed, and the pitch of the ore bed may or may nor bear close relation to the inclination of the formation.

There is no probability of ore in every foot of the area described from mile post 166 west to the hard ore formation; if discovered in one place, it would not mean the entire area there was underlain with ore. There is a probability that ore beds would be encountered; it would be impossible to state the dimensions or extent. I could only guess at the percentage of formation where commercial ore could be a found.

I hesitate to fix ranges within which the percentage might fall with reasonable certainty, without taking time to make an actual calculation of the area underlain by the ore bearing formation and the area underlain by known ore beds, for the purpose of getting a ratio on which to hazard a guess as to that part of the formation not thoroughly explored. Any statement of percentage—one or thirty—or any range between, would be a guess, in the absence of calculations to ascertain the ratio between the areas of known ore in formation

thoroughly explored and the area known not ore bearing, in the same area. Even there I would be speculating upon the feature of finding ore beds in the unexplored part in the same proportion as found in the explored part.

It is my opinion that, if five per cent of the total area of the iron formation exposed in the Marquette range is found to be un-

meet fully the probabilities as they exist today. I do not think more than five per cent of the area of exposed iron formation in the Marquette range will ever be found to be underlain by iron ore, and my opinion is that the area ultimately found to be underlain by iron ore will be less than five per cent. I base the opinion on this, for one thing: The Mesaba Iron range has been thoroughly explored, by drilling closely spaced holes over a considerable part of its area, with the result that between 7% and 8% of the area of the ore bearing part of the Mesaba range is underlain by iron ore. The Mesaba iron range is a thick, gently southward dipping rock bed about a thousand feet thick, and the ore beds which occur in the exposed part of this formation have their greatest dimensions in a horizontal rather than vertical plane.

If the ore beds on the Mesaba range had their greatest dimensions in a vertical, rather than horizontal, plane, the surface area occupied by ore would be very much less than it is under existing conditions. The Mesaba iron formation contains more ore by volume, according to calculations, than does the ore bearing formation of the Marquette range. A very considerable part of the ore beds in the Marquette range have a large vertical component, and this fact, coupled with calculations, would render extremely reasonable, if not certain, the truth of the inference that the areas underlain by ore on the Marquette range are less in proportion to the total area underlain by iron

formation than on the Mesaba range.

The presence of an ore bed a thousand feet down, a quarter of a mile from the track, does not carry with it the inference that 1339 there would be ore adjacent to that under the track, at that

depth.

If the drill holes in the S. E. ¼ of N. E. ¼ of section 1, Negaunee, penetrated the same sheet of ore as is now being mined at the Maas and Negaunee mines, a comparison of the depth of the ore, there with that here, gives a measure of the pitch of the Maas-Negaunee trough. Assuming the same pitch as exists between the Maas and Negaunee mines, 450 feet in 650 feet for every 3 feet horizontally, it would dip two feet—approximately 33 degrees. 107 feet greater depth to the 1,200 feet level would take us 161 feet farther west; I mean that a depth of 1,200 feet in the Maas mine should be about 161 feet farther southwest than the present level, 1,093 feet.

To clear up any misapprehension of my meaning: When discussing the conditions known to be favorable for the concentration of bodies of soft ore in the Marquette range, I stated soft ores preferred synclines, and avoided the anticlines, as a general rule. By synclines, I meant any geologic structure which for ore concentration would answer same purpose—in fact, impervious troughs of all kinds.

These may be formed, not only by the folding of the rocks into synclines, but by the intrusion of igneous rocks in the iron formation, so that the point of intersection of the intrusive with a layer in the iron formation, or below it, forms a trough. Similar troughs may be formed by the intrusion of igneous rocks in the irregular masses, and some ore bodies are known to occur on impervious basements of intruded igneous rocks as well as in synclines and impervious troughs formed in other ways.

A drill hole within 250 feet of mile post 166 shows 21 feet 1340 of iron ore between depths of 600 and 660 feet. As we proceed west, the ore beds, if found, will be probably at greater depths, increasing, to the west, under the track; in the location of

the Maas and Negaunce mines, the trough pitches west.

ALLEN.

Cross-examination.

By Mr. Eldredge:

The two sheets of Defts,' Ex. 73 are separated by a stretch of country—that portion of which I have made no map, about a mile west of the Ishpeming city limits (mile post 172½) to a point two miles

east of Clarksburg (mile post 178).

The Negaunee formation and the Negaunee and Maas mine formation are different things. The Negaunee formation is the name of the ore bearing formation of the entire Marquette range, with the exception of the unimportant Bijiki schist. The eastern limit of the Negaunee formation is encountered by D. S. S. & A. at mile post 165.

The iron ore formation in which exploring has been done in Marquette city is a lean siliceous formation of Kewatin age, considered by geologists as unworthy of serious attention as an ore bearing prospect. It is called iron formation in geological literature, as it probably originated by action of the same agents as were instrumental in formation of the richer iron bearing rocks. Similar rocks, containing by analysis not over 3% to 5% iron, or less than the average basic green stone, are likewise called iron formation, though they consist mainly of pure silica.

Marquette city is, according to my knowledge, what is known as a lean, banded, siliceous, metamorphosed jasper. In this kind of rock, the iron is in large part concentrated in thin bands alternating with those of a more purely siliceous character, so that no part of this formation could be mined with profit, or

find a sale as iron ore.

The difference in the jasper at Ishpeming and at the Jackson mine at Negaunee, from that described, lies in the much higher degree of metamorphism of the Marquette formation and its lower content of iron; there is a difference in the ages of the two formations, the one at Marquette being the Kewatin age and very much older than the Negaunee ore bearing formation of the Marquette range. In the rock called jesper, as applied to the iron bearing

formation of the Lake Superior region, the iron may or may not be concentrated into bands of iron ore alternating with other bands composed nominally of silica, but the whole rock may contain iron in disseminated form, while nevertheless expressing a tendency for the concentration of the iron in higher degree in some bands than

in others. That is as near as I can get to the definition.

In the metamorphism of rocks, there are two principal kinds of changes, one known as katamorphism and another anamorphism. Assuming the formation at Marquette is an iron formation, it does not extend to and meet the Negaunee formation. It does not extend west to the Negaunee formation, as there can be no strategraphic connection and no real connection between rock of Kewatin age and rock of vastly under age, as the Negaunee formation, unless they are brought together by a fault, which in this case is not known to exist; if they were brought together by a fault, they would still be separate and distinct formations.

There are a considerable number of drill holes put down, and considerable exploration, not reported to the Tax Commission. The Negaunee formation extends farther east than shown on Defts.' Ex. 73, but not near the railroad. I left off of may map

all ore bodies over a half mile from the railway.

Concentration usually takes place in troughs bottomed by slate, but it may take place elsewhere. In any iron ore formation, such as the Negaunee formation, a merchantable body or iron ore could exist, unless the contrary is proved by prior explorations.

The main workings of Maas and Negaunee mines are on the same ore body. They are not a part of the same ore body as the Queen or Regent group, or as the Athens, Lucky Star or Prince of Wales

mines.

Considering the extent of the ore formations in corporate limits of Negaunee, I would say that the ore formation had not been fully explored. That territory affords one of the most promising fields for exploration for the discovery of iron ore in Michigan, Minnesota,

or Wisconsin.

The two holes I referred to on section 1 are located on Defts.' Ex. 73, Allen; one is almost north of the D. S. S. & A. station, about 800 or 900 feet, and the other, say, 300 feet north and 1,200 feet west. In the one north of the station, they encountered 105 feet of ore below 2,100 feet. In the second hole, they encountered 206 feet of ore below 2,784 feet; the hole stopped in ore. These holes were not revolutionary in the ideas they gave to geologists. I would say they were of importance to mining men, as tending to confirm

the ore possibilities in the Negaunee formation.

In broad outline, they were put directly through the hard ore formation, and at great depth struck the soft ore formation. It is a very reasonable inference that they confirm the idea that large portions of Negaunee are probably underlaid with merchantable iron ore. The results of drilling in Negaunee have shown that the soft ore measures in the lower part of the Negaunee formation are rich in ore, in many places deeply buried; great depth is not essential to occurrence of ore in this horizon. As you go west

in this iron ore formation, the ore bodies, if they exist, would be discovered at still greater depth; i. e., that part of the formation

more nearly in the center or trough of the fold.

There was no evidence of the character of Negaunee formation at great depth west of these two holes, until they were put down. folding or in some other way this ore body may be found west not to be so deep and to have changed, to some extent, its direction. Westerly from these holes, the ore will probably be at greater depth, if the formation continues as indicated by those holes, because the entire Marquette range is a great westward pitching syncline, of which the Maas-Negaunee syncline is a minor but component part; the whole thing pitches west.

Without assuming an extension of the Maas-Negaunee ore body in a continuous sheet to the deep holes in question, I would state that the ore in these holes is very much more probable at the same horizon as the Maas-Negaunee ore, and in the same syncline of fold. It is not necessarily a continuation of the Maas-Negaunee ore body, though the ore occurs at the same horizon. By horizon, I mean the ore occupies the same relative position in the Negaunee ore bearing formation, relative to the top and bottom thereof. I do not admit

that there is a continuous sheet of ore from those holes to the Maas-Negaunee mine. I think it is quite reasonable, and even probable, that that ore is at the same horizon as the ore in the Maas-Negaunee mines. I should consider it a discovery of

a new body of ore.

I know the properties on the hill south of the D. S. S. & A. in Negaunee—the Milwaukee, Davis and Lucy. I think the statement fairly within reason that these deep holes justified putting down deep holes all along that ridge, with a fair prospect of discovering bodies of ore. There is an indication that the Lucky Star, Athens trunk extends into the Lucy mining property, as shown on Defts.' Ex. 73, Allen.

I spoke of the probable existence of an ore body of 250 feet depth. The D. S. S. & A. does not cross the ore body, as known, but it is possible that the ore body extends farther southeast beneath the

It is about a mile west of the New York mine.

I would not go so far as to say that the occurrence of similar ore to that in these two deep holes on section one indicates ore below the Cleveland Cliffs and New York mines as a probability, but admit that it is a distinct possibility. It would be within reason to seek ore at lower levels than worked under the East New York mine and under the Cleveland Cliffs mine; the risk would not be so great as before.

The Negaunee formation extends to a very considerable distance beyond Lake Michigamme on the north limb of the Marquette fold, and on the south limb it extends to beyond the Republic trough; I count the Republic and Champion mines as a part of the Negaunee

formation.

If Professor Smythe said D. S. S. & A. generally is on the Negaunce fermation as far west as Kenton, that statement is not true in the strict sense. If Prof. Smythe made that statement, he 1345 un.lo.:btedly meant that for a large part of this distance the track is underlain by the Negaunce formation at enormous depth, but intervening between the track and the Negaunce formation in depth are several thousand feet of other rocks that are above and overlie the Negaunce formation. The Negaunce formation extends beyond Michigamme eight to ten miles and probably further. It is not as well known to geologists as that portion east; there has been no exploration. I judge ore formations by exploration; they may be traced magnetically.

Professor Smythe's statement, as I understood you, was to the effect that in his opinion the D. S. S. & A. was underlain by the Negaunee fermation as far as Kenton. Except by inference from geologic structure, assuming the railroad to lie over the formation, Prof. Smythe could know nothing about it if it was at the enormous depth suggested. To qualify all the statements in reference to quotations from Prof. Smythe, it is my opinion he has been incorrectly quoted, or, if

not, I misunderstood the matter as put to me.

The principles of geologic science are just as firmly established and just as dependable as those of other sciences. The business of mining, as conducted at present, is based to a very large extent on geologic science; particularly is this true in exploration for iron ore. The greater a man's knowledge of geology, the more intelligently he can advise as to the most likely places to explore; in the average case, he has no certainty that, when he has picked out the most likely place, ore will follow his exploration. There is no general certainty in geological work, when it comes to the actual finding of ore. All of

the geologic science that we know now, or may ever expect 1346 to learn or acquire, will never eliminate the element of chance

or luck in the mining business.

I am not familiar with the old workings of the Lake Superior Iron Co., at Ishpeming; I am familiar with the system. The custom was to preserve their shafts, and support the ground by leaving pillars. There is an enormous tonnage of ore in the pillars still in the Lake Superior hard ore mine. If it is the object of the company to save the ore, rather than support the surface, they can take the ore out; that is the common practice. Unless the surface is more valuable than the ore, it would be economy to take the ore out. In soft ore mining, filling a void, instead of allowing the ground to come down naturally, adds to the expense. I don't think any mining company would want a main line railroad track, that they had to maintain, to cross one of their ore bodies if they knew they would want to mine under it.

ALLEN.

Redirect examination.

By Mr. Wykes:

When I stated the most easterly limits of the Negaunee formation would be approximately one mile east of mile post 165, I meant that that point was the most easterly point I have shown on Defts.' Ex. 73,

Allen, but, as explained, this is not a complete map of the Negaunee

There are no active mines along the south line, cast of Eagle Mills. In the stretch of five to seven miles between the two maps (Defts.' Ex. 73, Allen), the probability of the track.

to the land under and adjacent to the track.

The fact that drill hole Ex. 73, Allen), the probability of ore is so remote as to add no value

over a hundred feet in depth stopped in ore is no indication 1347 that the entire ore body surrounding that hole would be of the

same thickness. In geology we never assume a distance of over 50 feet around a drill hole. It is fair to say that the conditions in a circle of 50 feet radius would be represented by what you find in a drill hole in the center; beyond that, experience has taught us to make no assumptions, because the uncertainty of the conditions are such that we cannot speculate further than 50 feet on the results of a drill hole in iron ore. There are exceptions to that rule; there are certain areas where it is safe to allow a little bit more than that; there are areas where it is not safe even to assume a distance of 50 feet; sometimes you cut it to 25.

The probabilities are that ore, if found under the New York and Cleveland Cliffs mines, west of the two drillings near the station. meaning the soft ore at the base of the Negaunee formation, would be as deep as that shown by the holes in section one. The information we have leads to that inference, but in this the inference that ore will be found is not very trustworthy; that is at a lower point in the pitch that begins up at the Maas and Negaunee mines and extends west-If it were in the same pitch, and if the pitch remained the same as indicated in the drillings in Negaunee city, the soft ore bearing horizon would be at depths almost, if not quite, beyond the reach of the drill.

I stated the dip changed and took a more horizontal turn, and it is not probable that the base of the Negaunee formation in these localities which we are considering is beyond the reach of the drill; i. e., I do not think that this rate of pitch continues for that distance, as we have evidence that it has already flattened out, but no trust is to be placed in any such reasoning, as a practical matter, because the ele-

ments in the problem are so elusive that there is no way of getting hold of them; we cannot make any definite calcula-1348 tions, and, if you did make an arithmetical calculation of that

pitch, it would have no value from the standpoint of prospect.

The elements in the problem which make the presence of ore in places unexplored, and places 50 feet around from present drill holes or workings indefinite, have something to do with the fact that I did not add a value for assessment purposes to the lands which had not been explored and which were the distance stated from explorations. As a fact, the mineral values on properties to which we now refer, namely, the New York and the East New York, were placed at \$12.50 an acre. They have no working mines on them; ore had been mined there in past years. All through the Negaunee basin, I followed the same rule, and included nothing for ore where I did not know of the presence of ore, or where I could not reasonably determine its existence. That was due to the uncertainty of finding ore or of knowing its quantity or extent, except where I had some previous exploration, or knowledge from exploration or workings. In other words, the values in property of that kind are purely speculative, and, while those speculative values may be sold, and there is a market for them, there is no way of ascertaining that market; the properties have no known intrinsic value, from an ore bearing standpoint, until ore is actually found. When we consider that probably not over five per cent of the entire area of iron formation would ever be proven to be underlain by iron ore, that course of reason is amply justified, because, if we assessed all of these properties which are not known to contain ore at high figures, it would result that we were taxing 95 acres out of a hundred at much above their value, though the other five per cent might be so valuable as to overwhelm these low valuations.

1349 I do not mean to alter in any particular my statement that exeavations of ore in reasonable and ordinary quantities found in this district at distances below the surface of 1,200 feet or over would not disturb the surface materially, and whatever subsidence there was would be so gradual that it could be taken care of by filling

from the surface.

1350

On July 14, 1914.

Charles A. Lindsay, a witness called by plaintiff.

Direct examination.

By Mr. Eldredge:

I am 49 years of age, and live at Albany, New York. I am Division Engineer of the Mohawk Division of the N. Y. C. & H. R. R. R. Co. I was educated at the University of Pennsylvania, graduated as A. B. in 1884, and took a post graduate course in 1885,

which gave me the degree of Civil Engineer.

After leaving college, I worked about four months with Underwriter's Association, Philadelphia, as a surveyor of fire risks, and then went to the Union Pacific in Nebraska in 1885, on preliminary surveys, location and construction. In July, 1886, I was on the construction of a 25 mile double track railroad, near Cincinnati, for Pennsylvania lines, and stayed there two years. I was then transferred to Pittsburgh, on the location of a branch railroad to coal lines in the Pittsburgh district; shortly after, was transferred to the Maintenance of Way Department of the Pittsburgh, Ft. Wayne & Chicago Railway, at Ft. Wayne, in charge of the engineering in maintenance of way on the Pittsburgh, Ft. Wayne & Chicago Railway, west of Crestline, including Chicago terminal. I was there until the spring of 1890, when transferred to Cincinnati, as Division Engineer of the Cincinnati Division of the Panhandle lines of Pennsylvania, from Cincinnati to Columbus, with branches from Xenia and intermediate points east of Springfield, Ohio, and west to Richmond, Indiana.

I stayed there until 1898, when I took service with the Southern

Railway, being Division Engineer on its Washington Division, to Lynchburg, with a fifty mile branch from Alexandria west 1351 into the Blue Ridge Mountains, and a 120 mile branch from

Manassas, Va., to the Blue Ridge Mountains, and a 120 mile branch from Manassas, Va., to the Blue Ridge Mountains, through the Front Royal Gap. I stayed there until 1901, when I took service with the Pennsylvania Division of the New York Central lines, located at Jersey Shore, Pennsylvania. This division consisted of the Fallbrook Railroad, from Jersey Shore and Williamsport north to the connection with the main lines at Lyons and Geneva, and west into the coal regions of Pennsylvania. The Beech Creek Railroad has many branches in the coal regions, and while there I laid the track and ballasted it, and finished it, ready for service, on 28 miles from Clearfield east, down the Susquehanna River Valley, to Keating, on the Pennsylvania, over which our company acquired traffic rights to Jersey Shore, so between the Jersey Shore and coal regions we had a low grade line favoring the heavy coal traffic, reserving the Beech Creek line for the return of the empty cars on heavy grades.

I was transferred from the Pennsylvania Division of the New York Central to the Mohawk, in 1902; was there until 1907, when I was transferred to the electric zone of the New York Central, 57th St. north, for a year and a half, and then returned to the Mohawk

Division at Albany; have been there since.

While in charge of the Mohawk Division, up until March, 1910, I had a charge of single track railroad from Herkimer, New York, north, through the Adirondacks, to the Canadian Pacific, south of Montreal, over which we had traffic arrangements into Montreal.

I have been in actual charge of maintenance since 1890; that began on the Panhandle system of the Pennsylvania. In all my subsequent experience, I have been in actual executive charge of

maintenance of way.

1352 I have given special study to railway operation, its effect on track, roadbed and track structure, bridges, trestles, and other structures, the cost of operation, and the amount and causes of expenses incurred in the different kinds of business conducted by railways.

I examined complainant's railway, arriving on its line July 10, 1914, and spending several days going over the line; the purpose of examination was to study the physical characteristics and condition of the property, and its operating and traffic condition, so far as such

rapid examination would permit.

I noted the passenger train speed, Houghton to Marquette, it being slightly over 40 miles per hour between stations, and at times obtained a speed of 52 miles per hour. I studied the train schedules

from the official employees' time table.

I had never been in this region before; I confirmed my previous impression that the ore industry was concentrated in a very small area. I noted the arrangements with other railroads, by which their trains were operated over the tracks of this company; I observed the traffic conditions, and that there was a denser traffic on certain portions of the line than on others. I figured the railroad might be divided into 5 zones, on which the traffic density varied greatly.

These zones, in the order of relative importance as to traffic density were: (1) Winthrop Jct. to South Marquette, (2) Winthrop Jct. to Nestoria, (3) Nestoria to Houghton, (4) South Marquette to Eastern terminal, and (5) Nestoria to west state line.

I asked and obtained the number of passenger and freight trains passing typical stations in each zone on a typical day in each month

of a given year; from a study of the figures, I confirmed my opinion that I have selected the zones properly, and that the

conditions I have described are those that existed.

I asked and received information as to the character of the tonnage, and was furnished a copy of the annual report of the South Shore to stockholders for fiscal year June 30, 1912. In this report I found, on page 11, a statement of commodities handled for years ending June 30, 1912, and June 30, 1911, in tons and per cents of total tonnage; this gave, ore 42.8% in 1912 and 41.42% in 1911, and lumber and other forest products 24.22% in 1912 and 23.82% in 1911.

The South Shore lines, with respect to physical characteristics, can be divided into two parts, that west of Marquette being very crooked, with severe gradients, that east of Marquette, being com-

paratively straight, with relatively easier gradients.

The railroad, Nestoria west, was laid with light rail, and the alignment and grade conditions were quite severe. Track conditions on that part were not as good as on any other part of the line. The line, Nestoria to Houghton, involves very crooked alignment, and some of the heaviest of grades. Nestoria to Marquette, the grade and curve conditions are not quite so severe as Nestoria to Houghton. The track, Houghton to Marquette, is well constructed and maintained; Marquette to eastern terminal, it is in good condition, well constructed and maintained, and of the highest degree of excellence of any track in the territory, and on it train operation could be maintained at the highest speed. The bridges, trestles and culverts, so far as I could observe, were maintained in a high degree of excellence.

The locomotives are not of excessive weight for the track conditions and speed made, and the passenger equipment is of a higher degree of excellence than would be found on most roads similarly

situated, and in fact better than the equipment of other lines 1354 into this territory; the freight equipment, I judge, is in keeping with the lines of other railroads. In passing over the road, I had with me Complt.'s Ex. 2, Riggs, and followed the

alignment, grade, rail and ballast conditions.

From observation of traffic conditions and study of time tables, I realized that with mixed freight and passenger traffic it would be necessary to superelevate the curves. I observed the principal curves and the superelevation, though I made no measurements except by the eye. I feel I am thoroughly competent to estimate from the action of trains passing over the curve. I found the elevations uniform around the various curves, the degrees of which I noted on Complt.'s Ex. 2, Riggs, and found them sufficient for the speed of the train I was riding on, and not too high for lesser speeds. I saw

no curve with 8 inch elevation, and I believe, had there been such, I would have seen it.

I observed the passenger trains and service, and studied their schedules, and was impressed with the fact that, for a road passing through a territory as sparsely settled, the extent, amount and general character of the passenger service was much above that which the country would support or warrant. I do not think it better than it ought to be; it might be improved in certain instances.

The only refinements of track and track maintenance, for any particular traffic, that I noticed was that I felt the curves were maintained to a higher degree of excellence, generally speaking, than the tangents; this condition was evident to me to be a tribute to the

comfort, convenience and safety of the passenger traffic.

As to whether the road was maintained in a way necessary for comfort of passengers, but not necessary for freight service, I believe the distribution of ballast, generally speaking, was greater

particularly east of Marquette, where swamp conditions exist; that was due to the fact that the high speed of passenger

service necessitated better and more copious ballasting, for safety, comfort and convenience. There is nothing peculiar about this line in respect to the bridges, in that bridges must be designed, constructed and maintained for the highest class and fastest trains to be operated over them.

Limiting my answer to ballast, ties, rails, other track material, roadway and track, bridges, trestles and culverts, undergrade crossings, and grade crossings, the track must be maintained for the faster passenger trains; there is always provided a margin of safety meaning that, if designed for a speed of 50 miles, a train running 60 miles an hour would still be safe. The destructive elements of traffic on track, in the order of importance, in my opinion, are speed, excess strain due to locomotive, and the weight of equipment and loading behind locomotive.

The effect of speed on track follows the fundamental law of physics; i. e., that the blow resulting from a moving object varies

with the mass, directly, and with the square of the speed.

The locomotive constitutes a very heavy mass on a short stretch of track—a concentrated loading. The axle loads of locomotives are usually much greater than those of cars. The springs must be more rigid than those of passenger cars. In consequence, the action of the locomotive on track is of the entire mass acting as a unit, and not of the individual wheels, as with a car.

Weight of equipment and loading has its effect, though I am not sure it follows the law of physics, so far as it affects track maintenance, in the direct ratio I have mentioned, as, if we assume the tonnage in zone 1 to be five times that of the line east of Marquette,

we might assume the maintenance expense in zone 1 to be 1356 five times that where the traffic was less dense, but from my observation and experience I do not believe that that ratio will follow; therefore, the expense of maintenance does not follow the direct ratio in increase of tonnage, but a less ratio. This would have to be determined by segregating the tonnage expenses of each

zone and comparing each zone separately, which would require book-

keeping. I am not able to form a judgment regarding that.

I would estimate the tonnage in zone 1 to be five times that of the zone to the east, and if the expenses in zone 1 were more than twice those of the other zone, I would be much surprised. On inquiry, I was advised that there was about twice the labor and one-third more consumption of ties in zone 1, but that the other expenses

did not vary materially from those east of Marquette.

If my method of apportioning expenses of maintenance be correct, it would be necessary to ascertain the total tonnage of passenger service and multiply it by the square of its maximum average speed, and take the tonnage of the freight service and multiply it by the square of its average maximum speed, and from that obtain a ratio. That ratio would disclose that passenger service causes the greatest expense for maintenance, both in destructive wear and on account of higher standard of maintenance for the comfort and convenience of passengers.

Assuming 522,000,000 freight ton miles and freight speeds of 20 miles per hour, and 212,000,000 passenger ton miles and passenger speeds of 40 miles per hour, speed assumptions being based on the time table rule, the ratio becomes 37.4% freight and 62.6%

passenger, by applying the formula M. V. squared.

There is a difference in the condition of equipment of the two classes of service, the freight being the more difficult to move in a given way. I think a proper and fair allowance for that element would reduce the ratio to 40% freight and 60% passenger.

1357 In my judgment, taking into consideration only the expenses of maintenance of way and structures named, the passenger traffic and the passenger revenue train mile- are more expensive to

produce than the revenue freight train mile.

In zone 1, there is a density of both freight and passenger traffic, closely approximating equality, while on the balance of the line the density of passenger traffic is equal to, if not greater than, the freight density, and moves at speeds of greater excess than the speed of the freight traffic. As a consequence, the burden of maintenance of the long stretches of lean territory, for the safety, comfort, and convenience of the passenger traffic, and the formula just given, distributes the tonnage over the entire line. Eliminating the tonnage and expenses of zone 1, and considering the conditions of zone 4, east of Marquette, I think the facts would prove the ratio to be 70% passenger and 30% freight.

In the operation of freight and passenger trains, there are other elements entering into the discussion which in an accurate analysis should be given due consideration, but, relatively speaking, these are of minor importance—in many cases almost trivial as compared with the elements of speed, mass of locomotive and weight of load behind it. Zone 5, Nestoria west, is the lightest line, and, because of worse physical characteristics of country and track, and the traffic conditions, the ratio would be between 60-40 and 70-30.

In arriving at ratio of 60-40, I have allowed 2% or 2.5% on account of the inferiority of freight, as compared with passenger, equipment. I intended to include both wear and weather causes of main-

tenance of way expenses on those particular items.

Taking into consideration other items of expense that might increase the cost of maintenance, such as trackage used ex-1358 clusively for one service or the other, the ratio that I would apply to the entire road, excluding allocatable tracks, would be less than 60% passenger and more than 40% freight. An equal division of the expenses between the two classes of service would, I think, make ample allowance on a most conservative basis for the relative cost of the two classes of traffic. In zone 1, the ratio would undoubtedly be reversed, though not directly proportional. the whole road, without studying each zone separately, I would take 50-50 as a conservative and fair method of estimating the division of expense. I should say that the gross ton mile ratio, as used by Thompson, was not proper for assigning the expenses due to the destructive effect of the traffic, as he gives no value whatever to the element of speed, which is of primary and greatest importance.

In my experience, the maintenance expense of plaintiff's railroad would be considerably less if there were no passenger traffic. It would not have to be kept in as good condition if it had nothing but freight; the difference, roughly, would be 20% to 25% less.

Referring to Thompson's testimony, that the greater wear on rail on curves on South Shore is to be found on the outer rail, and that the wear on that rail is about 20% above than on tangent, and that the wear on inner rail is about 5% above the wear on tangent, in the brief time of my examination, I could not go into such details, and I am unable to state the facts on this railroad. In my experience, the high rail on a curve wears out faster than rail on tangents, and faster than the low rail. I do not believe Mr. Thompson's figures would express the right proportion on any conditions that I have ever seen. Generally, we re-lay the low, as often as the high, rail, though sometimes we allow the low rail to stay in a little longer.

With regard to the testimony of Thompson, to the effect that the following elements cause expenses in freight operation in addition to the differences in weight.

(a) That the car wheels in the freight service are not run with their axles as nearly parallel as the car wheels in the passenger service: I have seen no instances of that kind sufficient to make any material difference in the problem.

(b) That freight trucks are inferrior to passenger trucks: I would not concede this, except as they might be maintained in a less perfect state than the passenger trucks. The design of freight car trucks is more rigid and more substantial in many respects, size for size, than passenger car trucks. The springs on a passenger car truck are more numerous, and the passenger truck is of a heavier and better construction. The element of comfort not being necessary in the freight car truck, it is designed to give sufficient elasticity,

so that the flow of the rolling load upon the track may be minimized.

(c) That freight car wheels are chilled iron instead of steel tired, is true, though the material used is not of itself a detriment.

(d) That freight car wheels are eccentric, and not true circles, like passenger car wheels: In my opinion, there are as many eccentric passenger car wheels as freight car wheels, and as many eccentric locomotive tires on passenger as on freight locomotives, and the influence of an eccentric wheel on high speed is greater than at low

speed. This element would not be material on freight equipment, but would be material on passenger equipment, and necessitate the

turning of tires more frequently to avoid accident.

(e) That irregular freight car wheels are more apt to freeze in the brakes or slide on the tracks: Not being able to concede a great amount of irregular freight car wheels, I cannot agree with the balance of the conclusion.

1360 (f) That the springs under freight cars are primitive, and inferior to those in passenger cars: While the average age of freight cars might be greater, with more freight cars of the lower type, I would not consider that this was of any great moment, or would in-

troduce any considerable factor.

(g) That freight trucks do not turn as readily on their centers as passenger trucks, and do not have roller side bearings, like pas-It is true that the freight trucks do not turn as readsenger cars: ily as the passenger trucks, because of the greater concentrated loads. The roller side bearing is comparatively recent, and has been applied to a large number of freight cars; there are as many freight cars in the country with roller side bearings as passenger cars. Ordinarily, the load is supposed to rest but lightly on the side bearings, and the element of resistance to curving, and consequent element of additional wear to track, seems to me to be too remote to be able to give an appreciable value of itself, though I admit that it does have substantial bearing in the general study of the problem, and that the irregularity of freight car wheels is an appreciable item of cost. The general condition of freight car wheels is less perfect than of passenger car wheels, but it does not introduce a tangible element of cost; the gross value of all these irregularities is of minor importance as compared to the elements of speed, weight, and engine effect.

Thompson's Ratio 1, of gross ton miles, is not, in my opinion, proper for division of wear cost, because it gives value only to the question of weight; it gives no value to the speed, which is of primary importance, or to the element introduced by the locomotive. In my formula, producing a ratio of 60-40, I took the ton mileage as given

me, and did not give value to the locomotive; had I done so, the passenger figures would have been higher, and the freight lower.

The only difference in the excess strain of a locomotive between the freight and passenger is that affected by the difference in weight, length of wheel base, number of axles, load per axle, and the general condition of wear, and to some extent by the action of the locomotive working hard. The stress would be nearly the same in each class of service.

In my opinion, weather stress is the most destructive agent of ballast, generally, though I cannot state as to South Shore. The next is the work in tamping, surfacing and lining track, mostly necessitated by the passenger service. The joints, due to the elements and the passage of trains, become low; the ordinary low joint is unobjectionable in freight service, but very objectionable in high speed passenrer service, and a large part of the labor in maintaining tracks is to line and surface them to keep proper condition for the comfort and convenience of the passengers. The ballast also is destroyed by disintegration, due to the absorption of moisture, or by frost—the action of frost. The St. Ignace ballast is limestone, which depreciates. I broke open two or three of those stones, just out of curiosity, to see whether that was rounded pebbles of that same formation, and I am of the opinion that it is, and it is a very soft limestone, most of the pebbles of the St. Ignace gravel, and will depreciate by exposure and by erosion and so on, and by crushing under the action of tools in working on it.

It is not proper to divide maintenance cost of ballast on gross ton mile basis because a perceptibly larger amount of work is done on account of the high speed passenger trains, and by frequent renewals

to keep the track in condition for high speed trains. I should say it would be proper to divide ballast expenses 60% passen-

ger and 40% freight.

While I cannot speak with accuracy, because I have not the statistics or facts, from my observation the road uses a large percentage of tamarack and hemlock ties and a small percentage of cedar; cedar ties are destroyed by mechanical wear, while over 85% of hemlock fail and are renewed because of decay. It is my practice to renew the ties more frequently when there are passenger trains, as a tie in freight track can safely be left much longer than if the track is used by passenger trains. The extra length of time depends entirely upon the passenger traffic, conditions and speed. If the speed of the passenger were very much higher than that of the freight train, we would take the ties out sooner, and throw away some of the useful life; in my judgment, the gross ton mile ratio is not proper to divide expenses of repairs or renewals of ties, because mere weight does not destroy the tie. I would divide on the basis of 60% passenger and 40% freight, except that in zone 1 it might be necessary to transpose (Witness produced table showing movement of trains in the several zones.) Typical stations were selected to give a fair measure of the train density by zones. The table is as follows:

Station.		July 15,	, 1911.	Aur. 15	Sept. 15,	
Station.	(a)	Pass.	Frt.	Pass.	Frt.	Pass.
Eagle Mills	. 1	14	34	14	26	14
Humboldt	. 2	10	9	10	18	10
Michigamme	. 0	12	12	12	10	12
Nestoria	. 2	12	9	12	8	12
L'Anse	. 3	8	4	8	6	8
Chassell	. 3	8	4	8	4	8
Brimley	. 4	6	7	6	4	6
Trout Lake	. 4	4	8	4	6	4
Newberry	. 4	4	6	4	5	4
Kenton	. 5	4	4	4	4	4
Lake Gogebic	. 3	4	5	4	4	4

⁽a) These figures refer to the zones and in the order of their relative traffic

Showing Number of Trains per Day Passing Stations on D., S. S. & A. Ry. in Michigan During Fiscal Year Ending June 30, 1912.

15, 1911.		Oct. 15, 1911.		Nov. 15, 1911.		Dec. 15, 1911.		Jan. 15, 1912.		Feb. 15, 1912.		Mar. 15, 1912.		Apr. 15, 1912.		May 15, 1912.		June 15, 1912.		Total.	
8.	Frt.	Pass.	Frt.	Pass.	Frt.	Pass.	Frt.	Pass.	Frt.												
	26	14	26	14	17	14	14	16	7	14	9	. 14	10	14	6	14	22	14	27	170	224
-	12	10	20	10	8	10	6	12	9	10	11	10	6	10	8	10	12	10	12	122	131
	10	12	8	14	8	12	8	12	9	12	11	12	8	12	8	12	8	12	10	146	110
1	8	12	7	10	8	12	10	14	9	12	11	12	8	12	8	12	8	12	8	144	102
1	6	8	4	6	4	8	4	10	4	8	5	8	4	8	4	8	4	8	6	96	55
	7	8	4	6	4	8	4	10	5	8	6	8	6	8	4	8	4	8	4	96	56
	4	6	4	6	4	6	4	6	5	6	4	6	4	6	5	6	4	6	4	• 72	53
1	9	4	6	4	4	4	7	4	4	4	6	4	9	4	6	4	6	4	6	48	77
1	5	- 4	4	4	4	4	6	4	2	4	4	4	4	4	4	4	4	4	4	48	52
1	4	4	4	4	4	4	6	4	4	4	8	4	7	4	4	4	2	4	6	48	57
I	4	4	4	4	4	4	6	4	4	4	8	4	6	4	4	4	2	4	4	48	55

raffic density, No. 1 being densest.



1364 I do not concede the propriety of dividing rails and other track material on Thompson's gross ton mile ratio. Rail renewals are necessitated by wear, distortion and inadequacy; rails are renewed principally on account of the high speed traffic. That ratio is not proper to be applied to the division of the common expenses for ballast, ties, rails and other track material.

As it would be unsafe to operate passenger trains at their normal speeds without the expenditure of money, money must be expended as much for one passenger as for a thousand. When I speak of the difference, I have in mind the safety, comfort and convenience of

the passengers.

In my judgment, Thompson's time ratio, 4, is not a proper ratio for the division of the items of expense for maintenance of way and structures due to depreciation, weather stress, decay or erosion, as the expense should be divided in the inverse ration of the time occupied, because of the greater importance of the safety and regularity of the passenger service. The cost should follow the service, and cost of maintenance is due to speed.

Thompson's time ratio is not proper or accurate to divide common expenses as to care of roadbed, general cleaning, patrolling and watching, bank protection, filling and other expenses, for the reasons just stated, and the patrolling and watching, bank protection, and expenses of that kind, are primarily incident to the passenger

service.

Thompson's time ratio does not properly, or with approximate accuracy, divide the common expenses as to the removal of snow, sand and ice, the maintenance of bridges, trestles, culverts, grade crossings, fences, signals, interlocking plants, snow and sand fences

and snow sheds, telephone and telegraph lines, etc.

1365 I do not consider either the gross ton mile or time or revenue train mile ratio as an entirely theoretically proper one, but, based on my calculations, the revenue train mile is the one that gives the more accurate result, because of the manner in which the speed and the importance of the passenger service and the engine element are ignored in the Thompson method.

In my opinion, neither the gross ton mile ratio or the time ratio of Thompson would properly divide the unallocatable property used in common by freight and passenger traffic. The reasons given as to division of operating expenses on these bases apply equally here. To divide the common property on the same basis on which common expenses are divided, as indicating use, would be a fairer measure than either of the two methods outlined by Thompson.

The side motion of a freight train at slow speed causes a strain on track when the engine is laboring hard. As compared to the gross effect from all causes of either class of service, it is trivial, because, when the engine is working in such manner, the cars are doing their least damage, as they are moving at slow speed, probably up grade, and hanging away from the engine; they are not doing the damage to track that they would if the whole train were moving as a unit. Passenger engines also work hard going up grades, and do more damage when doing so than a freight train; the damage is

more nearly proportional to the square of the speed, and the equipment behind a passenger engine always acts as a unit, as it is closecoupled, and there is not the slack that there is in a freight train. The blow of a locomotive has everywhere much greater destructive effect due to the greater mass.

Referring to Thompson's alphabetical list of 28 elements weighting the cost of freight service and making the revenue freight train mile cost more than the passenger train mile, while I concede that some of the items weight the freight side of the problem, I do not

wish to admit that they make-

[Folio 1366 missing.—Printer.]

consequential, and there are many offsetting instances, such as the carrying in freight trains of company material used in maintenance of common tracks.

(k) The hauling of business and private cars by passenger trains

may weight the freight side, but must be infinitesimal.

(1) The sustaining, through passenger expenses, of the sleeping and dining car service is an integral part of the service, and a source of advertising, and must be considered a part of the passenger service; it does not weight the freight side.

(m) The exclusive use by freight traffic of large amounts of mileage of line, side tracks and spurs may weight the freight side. This mileage and its cost of maintenance is relatively small, and

much can be allocated.

(n) The greater use of yards and terminals by freight traffic in switching does weight the freight side, if it is a fact; it would vary closely with the density of traffic.

(o) Double and triple tracking for the needs of freight service may weight the freight side, but will be due to traffic density.

saw, and believe there is, no such condition on this line.

(p) The use of main tracks by freight service in switching in greater proportion than in passenger service may weight the freight side, but will be trivial.

(q) The more frequent starting and stopping of freight trains in switching may weight the freight side, but is not a general fact, and

would be infinites-mal.

(r) Switching by road locomotives, not represented by road train mileage or appearing in switching records for first hour, does weight the freight side, dependent on accounting methods; it must be trivial.

(u) Greater length of passing track, to accomodate longer 1368 freight trains, does not weight the freight side; freight trains take sidetrack to avoid delay to passenger trains, and fact that track may also be used to pass freight trains ought not to give this feature undue weight.

(v, w, x) These do weight the freight side, but are trivial.

(y) The higher center of gravity of ore cars does not weight the freight side.

(z) Stational cost of freight movement, as freight cars are moved

superfluously in switching freight cars, may be added to the freight

side, but, if so, is infinites-mal.

(aa) The greater damage to track and equipment by greater number of flat spots on freight car wheels does not weight the freight side.

(bb) Greater injury to tracks due to reciprocating motion of engine sideways, because of alternately applying the power, the element of injury varying with the tractive force of the engine, being greater at slow than at high speeds, I cannot concede always adds weight to the freight side; it may in cases, but when the freight engine is working hard, the car effect is reduced to the minimum, offsetting in some degree the other; the train behind it is not acting as a mass, but is pulling the cars, and the engine alone damages the In passenger at high speed the engine also works hard, and has greater effect than a low speed engine working hard. Generally speaking, the sideway motion of the slow speed freight engine is of slight importance in track damage, and ought not to be given much. The engine works so in starting and in climbing heavy weight. grades, and the action reduces rapidly as the speed increases, and the effect on track also reduces rapidly.

The items which throughout this case are claimed to weight and add to the cost of the passenger train mile were listed for

witness by counsel as follows:

(a) Higher speed of passenger trains, requiring track elevations on curves and other adjustments.

(b) Greater expense to insure comfort, safety and convenience of passengers.

(c) Removal of snow to keep the road open during storms.

(d) Preference given to passenger traffic, delaying freight trains

and increasing expenses of their operation.

(e) That, of the unallocatable items of expense, 18.6% consist of transportation expense, of which 59% is items that have a direct relation to train movement, and a greater proportion being claimed to be incurred on account of moving passenger trains, because of the necessity of giving them the right of way, and

(f) That more superintendence is required by and given to passenger trains than freight, because of the greater risk and higher

speed.

After the statement the witness was asked: "What are your views

with reference to this statement?"

Generally, I would say that I know nothing of how these expenses are allocated, but all of these items which you have mentioned have a bearing on the subject. I think probably that would be sufficient. With the exception of the damage to the freight equipment, they are all of considerable importance.

The items which Thompson says weight the freight side of the problem are relatively trivial. The causes of depreciation are the destructive effect of traffic, decay, exposure to the elements, obsoles-

cence and inadequacy.

In answer to Thompson's statement, that the dynamic augment does not pass the elastic limit of the track structure until

speeds of 30 or 40 miles were reached, I do not understand entirely what he means, but the statement is unwarranted by either theory or experience; it gives the idea that the elastic limit is passed at speeds of over 30 or 40 miles per hour. Elastic limit is the point at which a body under stress begins to change its shape; having passed the elastic limit, it does not return to its original form, but has acquired a permanent set. If the stress continues further beyond the elastic limit, fracture results; if the stresses in track approach anywhere near

the elastic limit, there is danger.

The statement of Woodlock, from Vol. I, page 427, Wis. Railroad Com. Report, Buell case, that the part of cost of maintenance depending on traffic should be divided between the different departments of the service on the basis of locomotive mileage, switching included, in that the locomotive mileage alone is responsible for at least one-half the wear and tear of track because of the climination of the question of speed. At high speeds, the locomotive ratio would be higher than at low speeds; it would be as the square of the speed. I cannot conceive of any speed at which a freight locomotive alone should be charged with one-half of the cost of replacing the wear and tear of the track.

Mr. Woodlock states that the locomotive mileage alone is responsible for at least one-half of the wear and tear of track; that includes passenger as well as freight locomotive mileage. Assuming he means destructive action of the traffic by wear and tear, I would be more inclined to agree with him that his ratio is nearly right; he may include his wear and tear of replacement, no matter to what cause.

1371 LINDSAY.

Cross-examination.

By Mr. Wykes:

(Witness spent two days going over South Shore line, largely on moving trains.) I observed the character of the country, and of the track structure, the conditions of rails, ties, curves, ballast, rail joints, appurtenant property, curve elevations, traffic and business conditions, and the character and volume of freight and passenger business, and its density on different portions of the line. I asked no questions on the trip, and no information was volunteered, except

in one or two minor instances.

I did not find when the ballast or rail was put on the different stretches, except where indicated on Complt.'s Ex. 2. I have nothing to indicate the condition of the property one, two or three years before my examination. I cannot say what was added to the property, or the relative condition of maintenance, in 1913, 1912 or 1911. My answers, as to condition of maintenance, all relate to the time of my inspection, and to no previous time. I have testified in no other rate case, and have never before made anything bearing on a division of costs or laid down principles therefore, except in abstract study of problems connected with general study of track main(enance).

I tried to get the underlying principles on which such allocation might be based. From the time I returned to Marquette to going on the stand, I was engaged in preparing answers to questions submitted to me, which were in general before me in typewriting, as I testified. I had made memoranda of points for answer, and testified from notes. I asked for, and was given, the revenue train mileage, but did not get it for ore service or for different divisions separately. The only information I got on that line was the sheet showing the number

of trains passing selected points. I did not get the revenue 1372 train mileage by any subdivision of the road, or by the zones I fixed, and I got no traffic statistics in the passenger or freight service for any divisions, and did not become familiar with any. I

saw probably ten D. S. S. & A. passenger trains at passing points on the road; it may have been that I saw the same train more than once.

I made no detailed inspection of the locomotives, but saw some of the diagrams, and I inspected examples of those as I saw them passing over the road. I did not learn the relative wheel bases of locomotives in the different services, but studied the diagrams, and got a mental appreciation of the relation of the two classes of engines. I ascertained the ore tonnage was 42% of the total in a certain year, and did not ascertain the revenue train mileage of that business, but I got the impression that, due to short haul, it would be relatively smaller than if it moved over entire division. It might be 12% or 20%.

My method is applicable to zone 1, but I have no way of getting the statistics. The revenue train miles and the maintenance ex-

penses of zone 1 cannot be obtained from the record.

My formula, generally speaking, is M. V. squared. It would not be proper to apply 40 miles per hour in zone 1, because the passenger trains cannot, and must not, run at that speed there. To study the zone as an entirety, you must take all existing conditions—tonnage, speed, traffic density, and everything affecting that zone. In zone 1, where the speed of the passenger and freight trains is more nearly equal, and the freight traffic density is much greater, the freight should bear a very much larger proportion of the expense of maintenance than the passenger, in my opinion. I would still apply my

formula, after I found the proper speeds and weights, making 1373 allowance for engine effects. I add the locomotive in, and then add an increment to represent the destructive effect of

the locomotive, acting as a mass.

In the five zones into which I divided the road, I made no comparison by percentage of relative density of traffic, but simply went to the point of deciding one was heavier than another, and fixed the order. The passenger business follows practically the same separation, as to traffic density, as the freight. Zone 1, Marquette to Winthrop Jet., is the heaviest, and zone 5, Nestoria to state line, is the lightest, for both passenger and freight traffic. I am judging by the number of trains by selected points. Zone 5, Nestoria west, is of lighter construction and through relatively irregular country, which would increase maintenance cost.

The average weights of rail per mile were, 1913: east of Marquette, 105 tons, Marquette to Houghton, 106 tons, and west of Nestoria, 96.6 tons. There was some re-ballasting going on during my trip, and evidences of general re-ballasting within last 5 years. It becomes necessary to re-ballast from time to time, which is a constant practice. You let a strip of, say, 20 miles go for, say, 5 years, and then ballast sufficient to take care of it another 5 years, and you do alternate stretches of the line every year. The depreciation of ballast is a depreciation of the railroad.

I did not measure or ascertain the degrees of curve elevation; I knew it was not excessive. I saw 5 degree curves and decided that they would not elevate as we (N. Y. C.) would elevate them for our high speeds. I watched practically all the curves; I would judge there was no elevation over 5 inches. An 8 inch elevation would be proper for 40 mile speeds on 8 degree curve. There is an 8 degree curve in Zone 1, but at a very low speed point, and it is almost flat—

one or two inches elevation; that would meet the needs of both kinds of traffic, as the speeds of the two classes of trains in zone 1 were practically the same.

A freight train on that curve with no super-elevation would cause some wear greater than on tangent; it would be on flange side of outer and top of inner rail. That excess wear occurs from a train traveling at a speed to which the curve was adjusted. An excessive elevation of the outside rail for a slow speed would increase the wear on the low rail and decrease it on high rail. As the outer rail is elevated in height above the needs of the particular train, the wear on outer rail decreases and that on top of the low rail increases. percentage of curved track on the road determines primarily whether the excess wear on curves due to super-elevation is insignificant. Speaking of the South Shore, I should say the item was appreciable, on two curves of same degree, one elevated 4, and another elevated 1 to 2, inches, and the movement over both being at slow speed, nobody can tell what the wear due to higher elevation is; I should say there would be at least 10% difference in wear due to that particular cause. The increased wear is on ties also.

In zone 1, tie renewals are more frequent than outside that zone, they being 30% heavier there. The labor expended on main track in zone 1, eliminating exclusive freight track and branches, would run about double that in similar stretches in adjacent zones; this confirms my belief that the density of freight traffic in this territory causes greater tie renewal due to rail wear and to slow freight train movement, rather than to passenger trains. I should expect the cost of track maintenance per mile in zone 1 to be 1½ times the average of the adjacent zones, not taking into account the industrial spurs in that area maintained by separate forces. This is based on investiga-

tion and information.

for the remainder of South Shore per main line mile, taking into consideration all tracks necessary in operation, would be \$1,000; the annual average for zone 1 would be probably \$1.200, counting the double track as separate lines. My 1½ times as much refers to track

maintenance. There are other expenses which would reduce the pro-

portion to \$1,000 and \$1,200.

The most destructive element of mechanical wear is the train speed. As between the allowance which must be made for speed alone and that made for extra effect of locomotives, I am not prepared to say which is the greater; either one might be greater under certain conditions of speed. The effect of same locomotive would vary with speed; it might vary with different roadbed conditions. Before I could say that excess speed in passenger service, as expressed in the difference between 20 miles freight, and 40 miles passenger, per hour, would be sufficient to overcome the excess weight of freight, the effect would have to be calculated; but I believe that it would to the extent I have calculated by the application of my formula. That produced a ratio of 60% passenger and 40% freight; the difference is due to squaring the speed in each instance, and applying it to weight of entire train, including locomotive. This formula is the formula for impact. After applying the formula and finding the ratio of 60% passenger and 40% freight, I brought in other elements; my final judgment rested on a 50-50 basis. The modification was due to different traffic densities in the different zones, and numerous other comparatively minor, some trivial, and some appreciable, results and things that affect the problem; I want to be, and believe I am, as fair to the problem as it is possible to be, and that has permitted me to say that a 50-50 ratio is one limit and a 60-40 the other, and that the proper basis is between the two extremes.

The largest factor of reducing to a 50-50 basis was the conjection

of traffic in zone 1.

1376 Q. Why should you use that zone for the purpose of modifying your figures, when the traffic, that is, the tonnage and the mileage, in that zone enter- into the original computation of your 60-40?

A. In the absence of statistics that apply to each zone separately, and using statistics only that apply to the property as a whole, there is a possibility of grave error creeping in that might give a very unfair result, but the fact that the traffic in zone one is so dense relatively to the traffic on any of the other zones convinces me that the 60-40 ratio is a fair maximum ratio, so to speak, and the 50-50 ratio a fair minimum ratio. If we would exclude zone one from the calculation, I believe the ratio outside of zone one would run as high as 70 to 30, or even 75 to 25, by actual calculation, but we have zone one with us and must take it into consideration.

That 75-25 is without giving effect to extra locomotive loading. To add for the locomotive effect would cause the percentage outside zone 1 to go to some point between 75% and 80% passenger and 25%

and 20% freight; this would be a subject of calculation.

I think the refinements of track due to passenger service are included in passenger side of my computation, though I would not attempt to give amount there included, and no one could tell without statistics. All computations should be based on the highest passenger speeds fixed by the rules, and not necessarily by actual speeds; the trains run below the speed as often as above, and the variation from

the established maximum is so slight as to be inappreciable. You would not be able to get closer results of actual wear by taking each train with its weights and speeds separately, because you must keep your track up for your low speed train as much as for your high speed train, where you may reasonably expect such trains to run; your bridge and track must be strong enough for your heaviest load.

My modification from 60-40 to 50-50 includes the recognition of those elements of extra freight cost which I admit. I would not attempt to tell you the degree of importance I attach to any particular one of those by percentage, or in any way, with my present extent of study; the degree of importance that I would attach to all of them would be 2%. The rest of the modification would be due to all other causes; the margin is wide enough to cover a multi-

tude of sins.

Even when we get done, we do not know where the precise figure falls, with the statistics and figures we have. If we had statistics for each zone, we could more closely approximate certainty, and if we had statistics for each mile of road, we could still more closely approximate certainty; in such problems, as you go from the general to the particular, you are reaching certainty. It is not dangerous to speculate on generalities when you have nothing better; this is the best that can be done. I don't know anyone that has attempted anything as near; without a doubt, it is nearer than the revenue train mile basis. I have never heard of this particular formula being ap-

plied by any one.

I applied my ratios, not only to mechanical wear costs or expenditures produced thereby, but also to those produced by causes having nothing to do with mechanical wear. This is on the theory that I know no better method; I believe that is the best method, and the tail should go with the hide. Ordinarily, I think the mechanical wear cost is the greater, taking the entire structure. I have never been able to fix any proportion of the percentage of total maintenance cost due to weather and to wear, and have never put it into figures for particular items; other engineers have done so, but have varied greatly. I have noticed that one man says ties should be 90% wear and 10% weather, and another might reverse it. On South Shore, if we double the speeds of all the trains, the weather costs might increase very slightly.

1378 The increased speed might, for instance, "pump" the ballast, but, so far as a fence or building is concerned, the weather effect would go in the same ratio, whether the speeds were 10 or 90

miles an hour, or the tonnage large or small.

I do not apply the same formula to weather and mechanical wear costs as a theoretically correct proposition, but think it fair in this case. Applying the average train speeds, of passenger 27 and freight 16, to the ton miles, would produce ratios of 53.7% passenger and 46.3% freight; increasing the passenger speeds to 50 miles per hour, the results would be 91.03% passenger and 8.97% freight. That speed would materially change my opinion as to the application of this formula to expense of replacing depreciation due to decay, but would not change it as to the proportions due to the destructive effect

of traffic. I am not satisfied that in all instances the weather cost and

use of the track should follow the results of my formula.

I would not say the formula was incorrect because of the variation between 53-46 under average speeds of 27 and 16 miles, and 60-40 under average speeds of 40 and 20 miles. With speeds of 50 miles passenger and 10 miles freight, I would not apply the formula to weather costs, but would as to speeds of 20 miles freight and 40 miles passenger, and 16 miles freight and 27 miles passenger. It is difficult to determine the limits where you would cease to apply it, unless you have all the facts as to the condition of the property. There comes a point at which we must leave the formula and apply our judgment in the division of weather costs and in the division of the property. There is no connection at all between weather costs on the same basis as mechanical wear; it is a mere coincidence that I should use it in this case.

The property and weather costs should be divided in proportion to priority and proportion of their use, and you would apply a judgment in each case; it might be necessary to go into detail as to each particular item of the track structure; as we become

particular, we become certain. The mechanical wear cost does not vary directly with the tonnage; it varies more nearly with the square of the speed, which would be the maximum condition—the theo-

retical perfect condition.

The track damage would not necessarily vary with the square of the speed, but the cost of maintaining the track for speeds of 90, as against speeds of 20, miles an hour would vary as the square of the speed. The average cost per mile of track, including sidings, equated 2 to 1 on the Mohawk Division of New York Central, including all maintenance expenses, varied from about \$1,200 in 1908 to about \$1,800 in 1913; those tracks are all maintained for speeds of 35 miles per hour; some for speeds of 60 miles per hour, and, upon this, speeds of 90 miles per hour are attained, and we have to make good the depreciation caused by the 90 mile speeds; when I say speed is maintained for 60 miles an hour, I have special reference to curves on which 90 miles are not attained. On tangent maintained for 60 miles, 70 or 80 miles is perfectly safe, and the limit beyond that point is the limit of the engine and cars.

On South Shore, the maintenance for 40 miles an hour would permit speeds to 63 miles, or possibly beyond. I have never made any investigation to compare effect of speeds of 10 miles with speeds of 20 miles per hour on track; the difference between those would be small. As between 20 miles and 40 miles, the difference in destructive effect would not be appreciable, but in the cost of keeping the track in proper condition for such speed, because of the elements of wear and exposure to the elements, it would be appreciable. The cost of maintenance to permit speeds of 20 miles an hour would be more than

twice as much as for 10 mile speeds; applying the formula of M. V. squared as between speeds of 10 and 49 miles, it would cost 16 times as much for the latter. In applying formula for the speed, the increase from 10 to 20 miles multiplies your track expense attributable to that particular speed by 4; if the speed goes to 40

miles, it multiplies by 16, if the speed goes to 60, it multiplies by 33, and if to 90, it multiplies by 81, assuming the same tonnage for each train.

If South Shore were maintained for freight traffic alone, the maintenance expense would be 20% to 25% less. That is purely a question of judgment, upon which I have made no figures; it is in the nature of a guess. That would be the average in all items of the track structure. Track labor and tie and rail expenses would be less if we dispensed with the passenger traffic. I have never made any test to determine what the difference would be in expense for ballast if there were no passenger service, and know of no one who ever did, though I think there would be an appreciable difference on South Shore.

In saying what would be a fair amount to spend per year for South Shore ballast, assuming conditions to be as they are, you must take into consideration that the South Shore has evidently been neglected in years gone by, and that some of the present day expenditures may be due to that fact. Assuming the South Shore was in average good condition at all points, I would say an annual expenditure of \$25,000

per year for ballast would be about right.

If it were indicated to me, before I said that the road was ballasted beyond the needs of the freight service, that in 1910, 1911 and 1912 the expenditures for ballast, according to I. C. C. classification, were under \$7,000 a year (which is the fact), I would give more study to my answer, and would probably reduce my figure, as it was a very hasty estimate, from my own standpoint, where we maintain a very

high standard of excellence of track, much higher than South
Shore, and I might not be able to get down to a sufficiently
close approximation of their absolute annual needs of ballast;
I might be doing them a grave injustice by saying that they ought

to spend \$25,000 a year for bailast.

If they spent \$7,000 each year for 3 years previously, and in 1913 spent \$25,000, I would say that they were either discounting the future or paying for their past debts. In my estimate of \$25,000, I would include putting in the ballast, but I am satisfied that that would be a very high average annual renewal of ballast on the South Shore. If this were a slow freight line, without passenger traffic, einder ballast would be ample for the surface, but they are now putting on the more expensive gravel ballast. Assuming the South Shore to be engaged solely in carrying freight, I would expect it to spend less than \$7,000 per annum for ballast,—meaning, if the passenger service was taken off and the freight service was not increased in speed or volume,—including the cost of applying the ballast, at least 30% less, which would represent the difference between St. Ignace ballast and cinders.

Where the track returns, after the train has passed, to practically the condition in which it received the train, the elastic limit is not passed, though there would be quite a large track damage. A low joint springs up to its former surface. A rail does not acquire a permanent set, but the ballast is depressed and a permanent set occurs in it: the elastic limit of the ballast has been reached to the extent that it

has been displaced—that and the roadbed beneath it. That would be

a very minute degree for each train passage.

Q. So you don't agree that the train, traveling at a fast speed over a reasonably level and straight track, would cause somewhat less wear at a higher rate of speed?

A. I do not.

Q. Due to the fact that it is a shorter time in the place, and that there is a motion which keeps it up?

A. There is no such motion. Q. You don't agree with that?

A. I don't agree with that proposition. The whole track structure is depressed below the normal plans, and there is an appreciable wave or elevation of the track material ahead of the train; the enormous weight of the train presses that structure down in the ground, and there is a perceptible wave ahead of the wheel, and that little front wheel of the locomotive is climbing up hill all the time, and shoving that rail ahead of it, and in time causes that rail to creep, even up hill, where fast speed is made.

Q. Isn't that hill a little higher before a train that is standing still

than one that is in motion.

A. I have never measured it. I don't believe it is.

Q. You don't know?

A. I don't know, but I don't believe it is, from my experience. Q. You don't know whether it is a little higher ahead of a slow moving train than ahead of a fast moving train?

A. I don't know by actual measurement, and I never had occasion

to measure it on slow running trains.

Q. Applying the rule of physics to it, it would be lower in front of a fast moving train than in front of a slow moving train, would it not?

A. From my experience, I would expect it to be higher ahead of a fast train than ahead of a slow train.

Mr. Eldredge: Of course, you both mean equal weights, I take it? A. Yes, equal weights; the same engine.

1383 The Master: Does the attraction of gravitation act to the same extent on a fast moving body as it does on a slow moving body?

A My recollection of the force of gravity is that it is constant.

The Master: Does it have the same effect?

A. I believe so; that is my recollection of it, except possibly when you come into discussions of the inertia of the mass.

The Master: Doesn't the momentum of the body have a tendency to overcome, to some extent, the attraction of gravitation?

A. Yes.

With respect to yesterday's testimony regarding Thompson's alphabet, I didn't mean to include in the 2% estimate that I made on cross examination the excess tonnage, or the property feature; that 2% allowance was made in reducing passenger to 60% and freight to 40%, from 62% to 38.75%.

I didn't examine the South Shore bridges closely, and could not

tell you that I noticed a good many wooden trestles; I did not find

out how many there were for the freight service alone. The higher speeds, even to 90 miles an hour, are made across bridges. On a single span of trestle, no more than one locomotive would be permitted at a time. Generally speaking, the customary practice is to assume a certain load, of, perhaps, double header locomotives, and a certain weight per foot of train behind it. The stresses are figured out for that weight, and then in the calculation a certain allowance is made so it will stand a strain of 4 or 5 times that, and that is called the factor of safety. The greater the span, the slower the speed—the lower you can have your factor of safety. It is not likely that any one of the spans of wooden trestles on the South Shore would stand the weight of 20 locomotives, standing still. I would not say that it is not a fact that a locomotive rolling across a bridge with power

shut off does practically no damage to the bridge; I will say
that it might be less, because of absence of tractive force and

the effect of counter balancing.

Q. Now, Mr. Lindsay, assuming that the load for which a bridge is designed is four or five times the weight of the locomotive, and assuming that your formula, at speeds of 40 miles an hour, provides for locomotives piled three miles high, one on top of the other, isn't there something wrong with your formula?

A. The assumption is absurd.

Q. If your formula produces that, isn't your formula absurd?
A. It is not, because the assumption is incorrect, in the begin-

ning, and violates all principles of bridge engineering.

Q. Assuming, also, that the application of your formula, at speeds of 60 miles an hour, assumes locomotives piled seven miles high, on top of each other, that is the weight that you have provided for, that is, the loading of the weight by the square of the speed at 60 miles an hour, would you then concede that there is something wrong with your formula?

A. I get your point. The action of a moving train on a bridge, if the bridge is on a curve, the mass is not standing upright, but it is horizontal, and you get the longitudinal effect of that mass striking

the bridge on the curve, and not the vertical load.

Q. Then your formula is the formula for direct impact, is it not?
A. It is the expression of, I think, Newton, who calls it kinetic energy.

Q. But you engineers term it the formula for direct impact?

A. Bridge engineers, I think, probably used that term, and in their calculations they probably confined the discussion to the exact

amount of the train and engine and cars on the bridge, or 1385 that may be on the bridge, at any given time, with due

allowances for speed.

Q. I also wish to call your attention to the fact that applying your formula at 90 miles an hour assumes locomotives piled 16 miles high on a single point on the bridge or on the track structure, wherever it might occur; that would be absurd, and the bridge and locomotives would all go down very materially, wouldn't they, if there were 16 million pounds.

A. The assumption does not follow my ideas at all. As I have

explained, the mass moving in a horizontal plane, assuming a level track and rolling across a bridge, the effect of it is the thrust in a horizontal plan, and not a vertical; on the bridge, you would only get the vertical component of that load.

Q. Yet, you have assumed that the track damage will vary with

the square of the speed?

A. The cost of maintenance of bridges is so relatively small, as compared to the cost of maintaining track, that it has been given a

very small value in that formula.

Q. Let us eliminate the bridge for a moment. Your formula, then, applied to the track structure, assumes that the damage to the track increases as the square of the speed?

A. Yes.

Q. And the square of the speed, increasing to 90 miles an hour, would multiply the tonnage by 8,100, would it not?

A. By 8,100.

Q. By 8,100, and that assumes, does it not, that the damage to track structure at 90 miles an hour is 8,100 times as much as at one mile an hour?

A. Yes.

1386 Q. And that same thing can be applied to speeds of 60, where the multiplier produced by the square of the speed would be 3,600?

A. Yes.

Q. And also 40, where the multiplier produced by the square of the speed would be 1600?

A. Yes. Q. I understand that fully, and I understand the method of your application. Now, take on ordinary sidings, like they have on South Shore, about what speeds would you advise on those?

A. 15 miles per hour.

Q. The maintenance would be for 10 miles an hour?

A. Yes.
Q. And the limit of safety might carry it to 15, or even, possibly, a little more?

A. Oh yes, much more.

Q. On those tracks which are constructed for speeds, we will say, of 10 miles an hour, you have said they bear the ratio of 2 to 1, or approximately that, to mileage of main line?

A. That is the ratio that we used.

Q. That is about a proper ratio, 2 to 1 to 3?

A. That is debatable; Mr. Thompson makes it 3 to 1; some make it others; some make it less; the whole subject is still under discussion by engineers, generally—by the largest engineering body studying railway problems in the world.

Q. Applying your formula to that particular track, and raising that particular track to a 40 mile an hour track, while you carry it at the ratio of 2 to 1, or something like that, would, under your formula, involve the expenditure of 16 times the amount

that you have in there; does that indicate anything to give 1387 you any doubt about the correctness of your formula?

A. I have from the very start said that the V square would be the maximum, and that that would have to be shaded, as based upon, or determined upon, other conditions. The fact is that we have on our slow tracks, on the Mohawk Division of the New York Central railroad, been operating our slow freight trains at speeds of about 15 or 20 miles an hour, but the increase in the density of traffic has necessitated our operating the trains on those slow tracks at high speed, and it has resulted in a very material increase in the expense of maintenance of those tracks. We don't separate the costs as between one track or the other. I cannot say, but I know that we have had to take out all the 80 pound rail and relay it with hundred pound rail, and increase our tie renewals, and use stone ballast instead of gravel ballast, and that process must continue, and it has increased our labor cost, etc. There are a great many elements in the maintenance of the track that, perhaps, are not affected by the square of the speed, may be directly as the speed, and so on.

Q. I have understood, throughout, that your formula provided, not for track destruction, but for maintenance to the point of per-

mitting the certain speed?

A. Generally so.

Q. Permitting, say, the speed of 40 miles an hour, if that is the speed that we use, the excess cost over trackage permitting speed of 10 miles an hour would be the difference between the square of the speeds multiplied into the tonnage; that is your formula?

A. I mean to say that, as tonnage increases, expense of mainte-

nance increases, but it does not increase in direct ratio.

Q. My question was principally directed to the speed part?

A. I was coming to the speed, and my contention is that, 1388 as speed increases, the cost of maintenance increases more than at a direct ratio, and that I believe it is somewhere between a direct ratio and the square of the speed.

The Master: That is as far as you go, is it, to say it is somewhere

between the direct ratio and the square?

A. Between the two. The whole subject is so unstudied, I might say, and still so vague, that I wouldn't undertake to say that that is an absolute formula. M. V. square could be applied with unfailing reliability and accuracy to all the details and to all cases, but I believe it is a fundamental principle underlying the whole proposition.

The Master: That is an enormous difference, isn't it, between a

direct ratio and the square?

A. The direct ratio, under the assumptions of tonnage that have been given here, would change the relative passenger and freight from 60-40 to 45 passenger and 55 freight.

Q. The direct ratio?

A. Yes sir, I have got it 45-55—45 passenger and 55 freight, instead of 60 passenger and 40 freight. Those are the limits between

which I would expect to find the right line.

Q. Now, referring again to the branch tracks and the equation of 2 to 1, on that assumption it would double the expense to raise the secondary track to the point of the main line, on the assumption of

2 for 1; and yet, if you apply the direct ratio of increase of speed to 40 miles an hour, you would multiply it, instead of by 2 by 4; that is the fact, is it not?

A. Yes.

Q. And if you used the square of the increasing speed, you would multiply it by 16, instead of by 2, would you not, with the speed of 40 miles an hour?

A. I cannot follow your logic.

1389 Q. I am asking you to answer the question. I don't care anything about the logic of it; I want you to answer the question, yes or no, or show me where I am wrong in asking it?

A. I don't understand the question.

Mr. Wykes: Read it, Mr. Luther, please, and let the record show you read it.

A. Could I delay the record long enough to write that question

out, and let me look at it?

The Master: Yes.

Mr. Eldi Nge: I suggest that I think, from what the reporter read, he may have what precedes it or he cannot answer it intelligently at all.

Q. Before we go to that, there are the correct figures on the figuring that you did; will you check yours, to see whether you are right. Let me put it in another shape, that Mr. Parker has it here on his sheet, and perhaps we can get it in shape. Mr. Lytle has testified to a cost of maintenance for this secondary track of \$350 per mile, and we will assume that it is kept in condition for 10 mile service, that is, for a speed of 10 miles; that fluctuates up. Main track, you have said, and I think the record proves that you are about right, costs \$1,000 a mile to maintain; now, applying your formula to the branch, maintained at \$350, squaring the 40 miles that is permitted on the main track, we produce a factor of 1,600 as the square of the speed; now, multiplying that speed into the cost of maintaining the track at 10 miles an hour would produce a cost of maintenance for main line of \$5,600 per mile?

Mr. Eldredge: One moment. I object to the question, because the assumption is that the expenses to which witness has been re-

ferring include only the expenses that the witness has been applying his formula to, whereas, as a matter of fact, they 1390 include many other and different items of increased cost, to which the witness has not attempted in any way to apply his formula.

Mr. Wykes: You must not forget that Mr. Butler took Mr. Riggs through the items of maintenance of these spur lines, and that the items of maintenance that were left when he got through were limited practically to those which this witness says he affects with this particular factor.

The Master: You may put the question as a hypothetical ques-

tion.

A. Do I have to answer that question by yes or no?

The Master: You may explain.

Q. I wish you would answer it by yes or no, first, if you can.

A. I would say, theoretically, yes; but that is the striking and strongest proof of my argument that the expense does not increase with tonnage at slow speed—that, on a track of that character, you can increase your tonnage without materially increasing your expenses.

Q. But you cannot increase your speed without increasing your expense in accordance with the square of the speed, if your formula

is correct, can you?

A. With the modifications that I have said as between the square

and the direct.

Q. Making the modifications that you have given would reduce about 20 per cent; reducing the 5,600 by 20 per cent would take out of it less than \$1,200?

The Master: How do you get the 20 per cent? I don't understand.

Mr. Wykes: It is the difference between 60-40 and 50-50, or, as he has put it this morning, 45-55.

The Master: The difference is the difference between the direct

ratio and the square; that is the difference?

1391 Mr. Wykes: I fear you and I are not talking about the same thing.

The Master: Perhaps not.

Mr. Wykes: The witness has stated that, due to the fact that this peculiar condition resulted, he modified his formula from 60-40 to 50-50; what I wish to indicate is that, inasmuch as his modification was only a modification of 20 per cent, whereas it should be a modification of something like 600 per cent, he is evidently wrong in one place or in the other place.

Mr. Cotton: I object to the question on the theory that it assumes that the effect in the direction of a moving train is the same as if it were a vertical effect, and that there is no direct ratio between the striking effect of these two influences, or the two trains, and the ex-

penses of the maintenance of the track.

Mr. Wykes: My dear sir, you must not forget that your witness' formula was a formula for vertical effect, or horizontal effect, I don't care which it is, horizontal effect of impact. Go back and read the question, Mr. Luther.

Mr. Eldredge: I am utterly unable to understand the question.
Mr. Wykes: I understand it thoroughly, and I also understand

the witness' theory.

The Master: Let us find out if the witness understands.

Mr. Eldredge: That is no evidence that I do, and if I cannot understand it I would like to be certain that the witness does understand it before he answers it.

A. I don't know that I can answer your question, because I cannot follow your mathematics. The Master: You don't understand the question?

A. I cannot comprehend what he wants me to decide upon.

Q. We will get back to it again. 1392

A. All right.

Q. You told me, what I stated, producing the cost of \$5,600 a mile was theoretically correct—you said theoretically?

A. Yes.

Q. Now, in applying your formula to the tonnage, you did apply it theoretically, didn't you, in reaching to 60-40?

A. Very generally.

Q. You simply worked out the mathematical computation upon

the tonnage as it was given to you?

A. To get 60-40, yes. I made the assumption that the tonnage was uniformly distributed all over the entire territory, and that all that tonnage struck every portion of that territory.

Q. And then you modified that from 60-40 to 50-50?

A. Yes. Q. The range of difference between 60-40 and 50-50 is not over

20 per cent, is it?

- A. I would have to figure that out. You have me so confused that I don't feel that I could properly pass upon it at the present time.
 - Q. I will say that it is about 20 per cent? A. I am willing to accept your statement.
- Q. A computation will indicate it at any time, on the figures that are on the record.

A. All right.

Q. What I want to get at is whether your modification is sufficient if the result of the application of your formula is to increase the maintenance of secondary track, which costs \$350 a mile and which, on your testimony and on the testimony of Mr. Riggs, would cost

from \$700 to \$1,000 a mile to raise to the point of main line, and if it is indicated that the application of your formula, 1393 instead of raising that to \$1,000 a mile, raises it to \$5,600

a mile? Let him answer it, and then put in your objection.

Mr. Eldredge: One moment. I will make my objection before he answers it, where it belongs. The witness' formula has only been applied to the destructive effect of traffic; the question implies that it applies to the difference in the cost of the construction of road, to which the witness has not applied it in any way, shape or manner. The question is directed entirely to the difference in the cost of construction of road.

Mr. Wykes: I beg to differ with Mr. Eldredge's statement, because the witness' formula was not directed to the making good of the elements of wear, but to provisions, as he stated, for taking care of a track at 40 or 60 miles an hour, or at whatever the high speed might

Have you the question in mind?

The Master: Do you desire to have the question read?

A. Yes sir. The formula could not be applied to a condition of that kind.

Q. Let us take a condition of another kind: You have stated that to maintain the main line of the South Shore outside of zone one would take approximately \$1,000 a mile per annum; you have also stated that, if you got rid of the passenger traffic, thus reducing your speeds to the freight speeds, you could reduce the costs by 20% or

%, and yet the application of your formula, instead of indicating a difference in costs of 20% to 25%, would indicate a difference in cost which would raise the lower figure 16 times; then, is your

formula correct?

A. The formula is correct, but the application of it is wrong, because you are applying it to other elements than those which are due to speed. You are applying it to everything, whether affected by speed or not, and my other figures were based upon the general maintenance of the property.

Q. That is true, but the effect, then, of the application of your formula to the speed items would tend to increase those 16 times;

that is correct, isn't it?

A. It looks so, on the face of it.

Q. And yet you have only allowed 20% to 25% difference between the two services?

A. That is right.

. The Master: Isn't the difference between the direct ratio and the square so great as to render the formula practically of little value?

A. The formula is, I believe, fundamentally correct in those items which speed affects; there are items in maintenance of track which speed does not affect.

The Master: With so great a margin, is the formula practically of

much use?

A. I believe it is.

The Master: It leaves us very much in doubt as to where, within

the margin, the fact lies.

A. There is perhaps an area there of doubt, a river of doubt, so to speak, but I believe that the use of a proper consideration for the speed at which traffic moves is fundamentally the principle on which the division should be made.

The Master: By assuming that to be true, is this formula which you have given the best and most accurate way of getting at that?

A. I believe so.

The Master: You don't know of any other way?

A. I know of no other way.

Q. Your formula is a rule, but you admit that it must 1395 have modifications?

A. Yes.

Q. Now, give us the rule, so as to make it a part of the total rulethe rule of modifications?

A. That is largely judgment. Q. Entirely judgment, is it not?

A. Entirely judgment, so far as this science has advanced.

Q. And so, in the application of your theory, the question of whether there is a profit or a loss in a particular service gets down to the point of depending upon the judgment of the witness, does it not? A. Largely. Engineering, you know, is education 2% and 98% common sense.

Eccentric wheels are somewhat more numerous in freight than in passenger service. I have never ascertained the degree of variation from round. In freight service on South Shore, assuming 3,000 cars, there would be 24,000 wheels, and in passenger service, assuming 71 cars, there would be approximately 850 wheels, so, depending on speed, if there is damage due to that element, it is more prevalent where the wheels are more prevalent. At equal speeds, it varies with the number of flat spots, or eccentric wheels; the ac-

tion of a small flat spot is greater at high than at low speed.

At equal speeds, it would increase as the number of wheels increased. The presence of foreign cars, representing an interchange debit balance of \$46,000, or 100,000 foreign car days in a year, would

also weight the freight side to some extent. The freight car also weight the freight side to some extent. The eccentricity which may result is due to the different rates of shrinkage of the casting as it cools, and in part to the density of the metal as it cools. Some parts of the wheel wear out faster than other parts; there are often differences of as much as one-half an inch in the thickness of a locomotive tire, and that causes track injury at high speed. Locomotive and passenger car wheels are a true round when they come out of the factory, and they vary only as sliding or breaking causes wear. A very slight irregularity, whether flat spot or eccentricity, will produce, at high speeds, perceptible track damage; the damage at slow speeds—say, less than 30 miles per hour—is insignificant. I do not think that they would produce much damage below 30 miles an hour, but at greater speeds we see the effect of the flat spot on the rail.

I have never figured out the maintenance cost of producing a car mile, a train mile, or a ton mile, and know of no one who has. I have not attempted to refine that problem between the different

speeds, at all.

I watched the South Shore ties closely, as I rode over the tracks to note rail cutting and rotting, and examined the percentage of renewals, and I gathered the impression that the renewals were ample and well distributed. A good tie life for a tamarack tie in this country would be 6 or 7 years; if the line were devoted to exclusive freight service, dependent on ballast conditions, the life would be in the neighborhood of 6 or 7 years, and, if you had a mixed service, you would probably get more than 6 years life out of them. We take ties out of our railroad on passenger tracks sooner than out of freight tracks. Assuming the L. S. & I., practically an exclusively freight road, has tie renewals on about the same ratio as South Shore, rather than say South Shore was not maintained beyond the needs of the freight service, I would say L. S. & I. was maintaining that track to a higher degree of excellence; whether higher than necessary would depend on the charactor ter of their freight traffic, of which I am not able to judge.

Track maintained at a lower standard of excellence than the South Shore might increase the cost of their car and locomotive repairs; just what the extent of that would be it would be diffi-

cult to ascertain or estimate; you would have to have experience to do that.

My answer, that the passenger cost of carrying employees and free passengers was inconsequential, was that it was generally so relatively small that it was inconsequential; I have no figures to indicate that, and can only assume by analogy to our own experience. You could add 10%, 15% or 20% more passengers to the moving equipment, without increasing costs, on the same principle that you could increase the tonnage in a dense territory without increasing expenses.

My formula makes no provision for the segregation of tracks used exclusively in certain services, and makes no loading for the greater use of terminals, extra sidings or switches, or things of that character, by freight service; it simply applies to the line over which the speeds taken into account are made. To properly apply that formula, you would have to divide the territory, first into zones, then allocate tracks wherever possible, and apply the judgment, after that. If it were indicated that 32% of the time of freight trains is engaged in doing stational work, that, so far as the cars are in motion, would weigh the freight side.

An ordinary freight train of 30 cars would be 1,200 feet long, and it would be good operating wisdom to make the passing siding long enough to take care of a train of that length. Where you have a longer passing track than your longest freight train, that would possibly involve its use by two freight trains. It is as necessary to get the passenger train by the freight as to get the freight by the pas-

senger train, and the freight by the freight.

1398 Lindsay.

Redirect examination.

By Mr. Eldredge:

On our fast passenger tracks, it has been necessary for us to restrict the speed of engines running light to 45 miles per hour, as we found that above that speed causes undue injury to the tracks; a locomotive running light would do more damage than drawing a train, at the same speed.

LINDSAY.

Recross-examination.

By Mr. Wykes:

In my conferences with Mr. Eldredge on the days since going over the line, there were present Messrs. Eldredge, Cotton and Tracy; and, at one conference, Messrs. Berry and Howard were silent witnesses. I went over the evidence that was presented to me before them. (They have been present in the court room during most of the witness' testimony.) On July 16, 1914.

JOHN B. BERRY, a witness called by plaintiff.

Direct examination.

By Mr. Cotton:

I live at Oak Park, Illinois; am a Consulting Civil Engineer. After graduating from high schook, I graduated from Day's Academy, as a civil engineer. I devoted one year to a post-graduate course in the same school, in higher mechanics and designs of bridges and trestles. I worked, during vacations, on the West Shore terminal at Weehaw-

ken, N. J.

1399

My active work began with the Northwestern, with whom I spent twenty years, the first fifteen on location and construction of new lines, and as Roadmaster, Bridge Superintendent, and Division Engineer of what was then known as the Wisconsin and Galena divisions. As division engineer, I co-operated with division superintendent in getting economical operating results. The last five years of service with Northwestern I was Chief Engineer of lines west of Missouri River, in charge of location and construction of new lines, and had a strong voice in the maintenance of the existing lines.

I then went to the Union Pacific, as Chief Engineer, when Mr. Harriman bought in, and was with them over seven years. During that time, we developed and built and changed all of the Union Pacific railroad as it is today, and developed other lines, since built.

I was also, for two years, Consulting Engineer of the Oregon Short Line, directing its policy of economics, and with the Oregon Railroad and Navigation Company, in consultation on engineering questions. With the latter, I acted because Mr. Harriman directed the presidents to consult with me in all of the economics or large engineering questions on their line.

While Chief Engineer of the Union Pacific proper, I kept 1400 close track of the use of rail, ballast, expenditures per mile, the economics of grade reductions, changes of line, etc. While there, I was delegated to investigate other lines Mr. Harriman had in mind to purchase. At the time that they talked of building what is called the Lucin cut-off, Ogden to Lucin, about a hundred miles, I was a member of the Board consisting of Mr. Hood, Chief Engineer of the Southern Pacific, Mr. Krutschnitt, General Manager, Mr. Burt, President of the Union Pacific (also engineers), and myself, as to the desirability of building the line.

After connection with the Union Pacific, I went to the Chicago, Rock Island and Pacific, as Chief Engineer, with duties similar to those on the Union Pacific. While with them, over seven years, I was part of the time Supervising Engineer of the Frisco lines. At the time of the divorce of the two roads, I was divorced from the Frisco work. During that period, I did considerable special work. For example, the Grand Trunk & Wabash used the same tracks from

Detroit to Suspension Bridge and Black Rock. The Wabash wanted a new contract for trackage over the Grand Trunk. They employed me to work up the value of that line; they accepted my valuation.

I also served in charge of the valuation of a piece of joint trackage between the Illinois Central and Vandalia, part of the Pennsylvania system, between Maroa and Decatur Junction. They accepted my decision and valuation. I made a report regarding the value of other lines for the Union Pacific, and worked for them until April, 1914, when I resigned and opened an office as a Consulting Engineer, in Chicago.

While with the Rock Island, I was Chief Engineer, until I resigned as such, in April 1913, at the request of the President, and for one year I was Assistant to the President of the Rock Island.

1401 During that period, I was one of five engineers of the western group of railroads, lying north of the Ohio and west of the Pacific coast and south into Texas, in negotiations to agree upon basic principles as between the Government and the railroads, under Fedral appraisal, meeting with the Government and Mr. Prouty; when I left the Rock Island, I left that position.

I am the Mr. Berry to whom the President of the United States tendered a position as a member of the Board of Consulting Engineers, to determine upon the advisability of either the sea level or lock of

the Isthmian Canal.

I have also done work for the Canadian government, making a

report regarding the Grand Trunk Pacific.

While Chief Engineer of the Rock Island, I was employed by the Northern Pacific, to estimate the value of their property to be used in the Minnesota and the Spokane rate cases. I did that, and testified in both cases.

I am a charter member and was twice director of the American Railway Engineering Association. I was one of the first members of the Economics Committee; am now a member of its Rail Committee, and a joint member of the committee, of that Association and the American Society of Civil Engineers, on Stresses and Track, of which

latter society I am also a member.

In 1898, when we started these large expenditures on the Union Pacific, about the only good work on the Economics of Railway Location was that by A. M. Wellington, a very very able man. The work called the Economics of Railroad Location, bulletin No. 49 of the American Railway Engineering Association, was the result of my effort to simplify the use and application of Wellington's work

to work of location.

I have had over 35 continuous years of service on railroads; about \$150,000,000 has been expended under my direction during that period. I have given attention not only to railroad construction, track construction, roadway repair and maintenance, and railway operation, but also to the effect of operation on track, roadbed, bridges, trestles and other structures, and also in reference to the amount and causes of expenses incurred in the different kinds of business conducted by railways.

I also prepared the value of the Rock Island in Oklahoma and

Arkansas, getting ready for the two-cent rate cases in both states, and not only as to the value, but somewhat in the accounting methods of maintenance of way and structures subdivision, and, as to all expenses that could not be allocated, I was consulted, in a minor way, as to

the best way of arriving at the percentages.

I spent four days in examination of plaintiffs' railroad, riding over it on trains; the purpose was to examine quite minutely into the general condition of track and structures. As a whole, I think the physical condition of South Shore as good as it ought to be for the character and extent of the traffic. On the west end, largely in Wisconsin, where they had much 60 pound rail, I did not think the condition of track hardly as good as it should be; this was true, Nestoria to the state line, though I thought, there, that even that poor rail rode as well as could be expected. I found the line, Nestoria to Houghton, better than I thought it was there. The condition of the right of way on the whole road was excellent, and much better than on ordinary roads.

The officers of the railroad with us always got out when we stopped to make any examination, and freely gave us all information we asked for. I found the frogs were of the latest type, and the split

switches 15 feet long, well reinforced and of modern construction. I found a great many timber bridges had been taken out, filled, and culverts of reinforced concrete put in; the new type of bridges were ample for any type of locomotive then on South

Shore.

I asked Messrs. Jackson and Stafford (division superintendents) how they were elevating curves, and they gave me their table. wanted to see how it compared with results found. I worked out the formula and elevation in use by South Shore up to 7 degree curves on the basis of 35 miles an hour, as I was told that was, and it afterwards proved, about an average rate of speed, minimum and maximum. found that the elevations they were using were very near to those I calculated for the formula. It was not alike around every curve; it never is, on any railroad, unless the maintenance is of a very high order, but it did not vary enough to be marked, except in a few cases. On the 20 curves that we examined we found no elevation higher than 5 inches, and only one of that height, and in my opinion there is no greater elevation on any of the curves I passed over. We examined only representative curves in Michigan, so as to get a representative statement.

The passenger train service on this road was fully as good as any other road similarly situated, taking into consideration the business necessities. On the inspection trip, we took observations of train speeds; for 9 miles west of Winthrop Jct., I took the speed, which averaged 35 miles an hour, including the little slow-up for Winthrop Jct.

On July 8, Mr. Howard and I took the time of arrival and departure of passenger train No. 1, St. Ignace to Marquette, at each station, and the time between mile posts for the whole distance; the results were platted on a profile. (Marked Complt.'s Ex. 95,

1404 Berry.) This profile correctly shows the results of our observations. Statement of the trip and results is as follows:

St. Ignace to Soo Junction:

Left St. Ignace at 9:38 A. M. Reached Soo Jct. at 11:20 A. M. Distance 42.9 miles; time 1 hour 42 minutes, or 25.25 miles per hour. Deducting stops at intermediate stations, running time was 1 hour 20.5 minutes, or 32 miles per hour.

There were eight of these intermediate stops, and another point, Greene, where the train came very nearly to a standstill, making an

average of about one stop every 4.3 miles.

It takes some time for the train to attain full speed after a stop. There is also a slowing down for a short distance as the station is approached, so that to attain the actual average full speed between stations it is necessary to eliminate miles in which stops actually occur, and the preceding or following mile, when the stop is at or near the end of a mile. As it takes less time to slow down than to get up full speed, it seems probable that, considering trains both ways, full speed may be expected up to within a half mile of the station, and even past the station itself for such trains as fail to stop.

Eliminating from this run the miles in which speed was reduced for stops, as above indicated, as also the first two miles from the dock at St. Ignace, the speed ranged from 32.7 to 48.6 miles per hour, or an average for 26 miles of 42.5 miles per hour. These speeds ranged as

follows:

Over 30, including 35 miles per hour, 2 miles. Over 35, including 40 miles per hour, 5 miles. Over 40, including 45 miles per hour, 13 miles. Over 45, including 50 miles per hour, 6 miles.

Soo Junction to Marquette:

Let Soo Junction at 11:40 A. M. Reached mile post 155 opposite Marquette station at 2:57 (and backed into station at 2:59). Distance 108.4 miles; time 3 hours 17 minutes, or 33 miles per hour.

Deducting stops at 16 interme iate points, running time was 3

hours 3.5 minutes, or 35.4 miles per hour.

Eliminating from this run the miles in which speed was reduced for stops, as above indicated, as also the last two miles going into Marquette, the speed ranged from 30.5 miles to 53.7 miles per hour, or an average for 76 miles of 42.86 miles per hour. These speeds are as follows:

Over 30, including 35 miles per hour, 7 miles. Over 35, including 40 miles per hour, 14 miles. Over 40, including 45 miles per hour, 25 miles. Over 45, including 50 miles per hour, 23 miles. Over 50, including 53.7 miles per hour, 7 miles.

On inspection trip, I noticed no maintenance or construction in excess of the requirements of the case, except, perhaps, the park at Marquette, park at Soo, and ladies' waiting room at Sidnaw; these are for passenger traffic, particularly.

It is in evidence that the average freight train speed is 16, and passenger train speed is 27, miles per hour, that passenger trains, frequently, for shorter or longer distances, make 35 to 50, and occasionally, but infrequently, 60 to 63.6 miles per hour, and that freight trains make occasionally, but infrequently, 25 to 35 miles per hour; under those facts, per unit of weight, the passenger train involves the greatest destructive effect upon, and requires the highest maintenance of, track, roadbed, track structure, bridges and trestles, on both curves and tangents, where the depreciation is due to mechanical wear, or destructive effect of traffic.

The locomotive is a more destructive agent, and has greater wear effect on track, than a passenger or freight car; the passenger engine running at high speed is more destructive than a freight engine of the same tonnage and character at low speed. The higher rates of speed and tonnage are more destructive to track than the lower rates of speed on a passenger train. The effect of speed is to unsettle the roadbed, hammer the joints harder, and make it necessary to spend more money to keep the track up to meet the conditions of high speed as compared with low speed; the effect is more pronounced on bridges

than on track,

In my opinion, it has been the practice, where traffic was confined exclusively or almost exclusively to freight traffic, that there is not so much money spent on either material or labor, to keep the track up, as where there is combined passenger and freight service; that would

apply to this particular instance. It applies in minor degree to bridges; to buildings very decidedly. I would not design a permanent bridge for a lighter load for freight traffic than for passenger, but for any wooden bridge I would wear it longer. The first and important consideration is to make your bridge and structure ample for passenger service, and guard against possibility of wreck. Freight locomotives run at slow rate of speed, and while you might design a structure with less impact for that lower speed, I know of no engineers who do that in connection with permanent

bridges.

On the wooden bridges, you would endeavor to carry them along, and piece out by getting at the rotten part and putting in a post; in that way they would last longer. Also, a passenger engine, running at high speed, is more apt to produce a break or crack in a stringer or cap than the same weight of engine at low speed. In a soft, marshy country, the speed and tonnage of the passenger train is apt to settle the piles into the ground more than the freight train, and you would not try to keep up smooth surface for the freight, as you do for the passenger service.

These remarks would apply to ballast, rails, ties and track structures or appliances. This railroad would be required to expend in maintenance of way upkeep, if it had only freight service, at least

25% less than the present service costs.

Referring to Thompson's testimony, that the greater wear on curves is on outside rail, and that wear on outer rail on curves is about 20% above wear on tangent, and on inner rail about 5% above wear on tangent, I say wear on rail on curves depends on degree of curve, locations.

tion and speed. On lighter degrees of curve, say 1 or 2 degrees, the excess wear is but little; but, as you go on to the high curves, say 3 to 12, it increases very fast. I cannot agree with Thompson.

that the wear on outer rail would be but 20% above the wear on the same rail on tangent. (Objection that, as this subject is deemed important, we should have actual figures of rail renewal on curves from company books.)

On the rails I examined on 4 to 7 degree curves, I would say that, with the same traffic, the rail on tangent of the same weight would last 10 times as long as on those curves on this railroad. On those curves, it is evident that the rail has been taken out at least once, and presumably more; in cases, the rails were transposed from lower to upper side. The tangent rail adjacent to that is frequently in good shape, with very little loss. Tangent rail everywhere shows that its life is a great deal longer than on those sharp curves, as quoted by Thompson (Note: Thompson did not refine his answer as to the degree of curve, and answered evidently as to his judgment of the average, while the witness has testified only as to the sharper curves.) On 4 to 8 degree curves, the life of the inner rail is but little longer than the outer, and it would not last more than twice as long; the tangent rail would outlast it 5 or 6 times.

I should say this railroad was in good condition, and reasonably well maintained and kept up for efficient service and safety, considering its present business. Taking into account the items of maintenance of way and structures which cannot be allocated, but which are common, I should say the passenger train mile creates the greatest amount of these expenses on this road; my only reason is that the revenue passenger and revenue freight train miles are very nearly the same, and, that being the case, with higher speed of passenger trains

the cost increases.

Where there is no passenger service, the cost for maintenance of way and structures expenses would be much less; the speed of passenger, as compared with freight, trains produces a large maintenance charge, it having greater destructive effect on track,

because the track is affected by speed as well as tonnage.

Answering Thompson's testimony, that the imperfections of freight equipment constitute the principal cause of expenses, over and above the difference in train weights between the freight and passenger train miles, and his 8 reasons therefore, I do not believe that the imperfections of freight equipment constitute the principal cause of difference in expenses over and above differences in train weights.

(1) It is true that car wheels in freight service are not run with their axles as nearly parallel as in the passenger service, but that is of

small consequence.

(2) It is true that freight trucks are not so good or expensive as passenger trucks, but they are ample for the service they perform.

(3) The fact that freight car wheels are chilled iron, instead of steel tired, wheels is true, but it has no bearing on the question of difference in expense.

(4) That freight car wheels are eccentric, egg shaped and not true circles, is principally true, though the expression "egg shaped" is not

proper; they are not turned true, like the passenger wheels or locomotive tires, but are put on as they come from the factory, and may

be a little eccentric, but not appreciably so.

(5) As to the freight train wheels, due to irregularity, being apt to freeze in the brakes, there is a little of that, depending on pressure, but I would say that it is extremely trivial, as the wheels on all passenger engines and cars wear spots on them as well as on the freight cars, being a little rough, so that they are just as apt to stick in one as in the other.

1409 (6) It is true that the springs under freight cars are not so expensive as under passenger cars, but they answer their purpose, just as the difference between a buggy and a lumber wagon. It would be a great misfortune for a freight train to have very much spring effect.

(7) It is true that freight trucks do not turn as readily on their centers as passenger trucks; but I do not think they need it; it is small,

anyhow.

(8) I do not know what Thompson means when he says the irregularity of freight car wheels is an appreciable item of cost; if it referred to destructive effect on the track I would say no, because the speed of the passenger train, with better wheels, would produce a worse effect than the freight car wheels, with their little irregularity.

From my knowledge of this road, and knowledge generally, I do not think that these imperfections constitute the principal cause of difference in expense, over and above the difference in train weights. between freight and passenger train miles. I should consider the imperfections in the freight equipment a minor item. I have read Mr. Thompson's testimony regarding his gross ton mile ratio, on which he divides maintenance of way and structures expenses due to mechanical wear or destructive effect of traffic. I do not believe this is proper, as it neglects the excess wear due to locomotives as against ears, and neglects speed. It does not charge up to the passenger service as much as it should. In my opinion, weather stress is the principal item affecting ballast. On South Shore, I cannot give the percentage of expense of maintaining ballast properly chargeable to passenger; it would be more for the passenger than for the freight. I would not divide ballast on gross ton mile basis, or basis for mechanical wear.

The principal cost of tie depreciation on this railroad is rot; the minor element is mechanical wear. In 1914, they are going to put in about 333,000 ties, 290,000 in Michigan, 81% hem-

lock and 19% cedar. Hemlock and tamarack rot out before they wear out, and cedars crush by the service; so I understand, from these renewals and from the fact that 1 am advised that for one or two previous years there was a greater proportion of hemlock and tamarack than of cedar, that 81% of this year's tie renewals would fail due to rot, and 19% to mechanical wear. The average life of hemlock and tamarack ties in this country is 6 to 7 years; under some conditions, cedars are good from 12 to 14 and in cases to 20 years.

The greater causes of depreciation of ballast on this road are the passenger trains at the higher rates of speed; the moving load with

high speed has a tendency to crush the ballast down, and necessitates

its renewal more often.

In my judgment, Ratio 1, gross ton miles, would not properly divide common expenses of ties, repair or renewals of rails, ballast, track maintenance and track surfacing and other material, because the gross ton mile considers straight tonnage, without consideration of

engine effect or of speed.

In criticism of Thompson's application of the time ratio to common expenses due to weather stress, decay or erosion, that method of division of those expenses is not, in my judgment, proper or accurate for application to these expenses. The method is new to me. Of all the methods for pro-rating expenses or value, it has the least merit. As to its application to value, many of the charges don't vary with traffic. Supposing one passenger and one freight train a day, does it look reasonable to compare a passenger train over the road at 30 miles an hour with a freight train over the road at 15 miles an hour, and allot the proportion of value in that proportion? For an interlocker,

it makes no difference whether the train uses 2 or 40 minutes, so long as it delays no other train. The expense is there just

the same.

Take a bridge a mile long and a passenger train 30 miles an hour and a freight train at 15. The maintenance of that bridge for the passenger will be greater than for the freight train, without regard to its length on that slow train, because it is not interfering with another train, and the necessities of keeping the structure up to a higher degree of perfection, and the possibilities of damage to members of a wooden bridge, are greater by the passenger than by the freight. I think the crux of the whole thing lies in the fact that it is ridiculous to make such comparison, when you know all the facts are against it. That would apply also to the common expenses of maintenance of

way and structures.

I cannot say where formula 4 could with justice and equity be used for any purpose whatever on a railroad. It should not be used in connection with depreciation, and it is grossly misleading. It is not proper, accurate, or approximately accurate to divide common expenses due to weather stress and depreciation. I never heard of gross ton miles for division of common expenses between freight and passenger, and never heard of Thompson's time ratio before. Thompson's time ratio is not proper to divide common property between freight and passenger service. On South Shore, the revenue train mile more nearly accurately measures the division of unallocatable expenses of maintenance of way and structures between passenger and freight traffic than the Thompson ratios, because it closely approximates what I think is the best method of dividing those expenses, and is nearest to certainty.

Other roads use the revenue train mile, but many other roads are using various other methods besides the revenue train miles, or even the gross ton miles. Some roads have been using the gross

ton miles unequated; they have used other methods, such as cost accounting and speed ton miles. They are trying more nearly each year to get speed as a factor, as well as straight tonnage.

I know of no case where they have used gross ton miles without the

equivalent of speed.

On bridges, the passenger locomotive at higher speed, if of the same or greater weight, and possibly if of lesser weight, causes the greatest destructive effect. The locomotive at high speed would produce a greater blow than lateral or side motion of locomotive at The side motion would be small in comparison. locomotive, being of heavier weight, its wheel would, at the same speed, produce worse effect than the lighter weight of a car wheel, I know what snow plows and devices are employed on this road, and where the greater cost would fall; it would be preferably to passenger. (Witness repeats the oft repeated claim of necessity of keeping the road open for passenger service.)

In reply to Thompson's testimony, to the effect that cost of taking the sidings by freight trains, to meet passenger trains, should be borne equally by passenger and freight, I am of the opinion that it is wholly a passenger expense. The freight train takes sidetracks at considerable delay and some expense, to let the passenger by. If it did not meet that passenger train, it could go on until it met a freight train, and there would be no necessity for that delay or ex-The passenger trains run first after road is cleared by snow pense.

plows.

I have read Thompson's and Lindsey's testimony regarding 28

reasons or elements alphabetically listed by Thompson.

The cost of transporting company material on freight trains, in my opinion, vastly out-weighs the cost of all the reasons Thompson has given against the freight, in favor of the passenger, trains.

1413 The greater tonnage of freight trains, as embraced in his first

reason, would be very small.

The handling of people on South Shore trains free I would consider very small. I do not believe they ever had a single car for free passengers; until they do, the weight of the passengers transported free cuts no figure at all in the cost.

(Witness here led to change various answers to say that haulage of company material in freight trains would offset all items of Thompson alphabet but the extra tonnage.)

Mr. Thompson's statements in his alphabet, in a great many of the items, are correct as far as they go, but they are small, admitting

a great many of them.

(a) Greater tonnage of freight trains. I do not know that that makes the freight train mile greater in cost than the passenger train mile; that is subject to analysis, and, in my opinion, with the revenue train mile in passenger and freight service very nearly the same—practically 50% each—I should say it is very small indeed.

(b) Greater number of wheel and wheel impacts in freight trains.

This weights the freight side, but small in amount.

(c) Greater weight and tractive force required of freight locomotives. This may be true, but is very little; speed must be taken into consideration as well as weight.

(d) That freight train wheels, trucks and parts are not kept in as good condition as on passenger trains. This is true, but I don't think it cuts much figure.

(e) Greater axle loading of freight cars. This is perhaps so, and

perhaps not; even if it is so, it would be small.

1414 (f) The greater time of use of the property by freight

trains, because of slower speed. This is not so.

(g) Greater wear on tracks, both in the straight and on curves, attributable to more rigid freight train trucks. This is true, and weights the freight side, but does not amount to much, as on South Shore the proportion of straight line to curves is very much in excess; there is very little of what I term heavy curvature line, and long pieces of straight line.

(h) Greater number of derailments and injuries to track, ties, etc., in freight service. This weights the freight side, but I do not

think it cuts a big figure.

(i) The difference in locomotive types in passenger and freight. I did not pay much attention to engines, except the heavier ones going on to the line since June 30, 1913, numbers 552, 553 and 554.

(j) The carrying of persons free by passenger trains, for both

classes of service. (Previously answered at length.)

(k) The hauling of business and private cars by passenger trains. This weights the freight side, but it is very little on this road.

(m) The exclusive use by the freight traffic of large amounts of mileage of line, side tracks and spurs not used by the passenger

traffic. This weights the freight side, but is small.

(n) The greater use of yards and terminals by the freight traffic in switching. This weights the freight side, but is small. In many cases, if not wholly, you can allocate those sidetracks in terminals and yards to the freight or passenger service using them, and what you cannot allocate would be very small.

(o) Double and triple tracking for the necessities of freight service. That applies to both; you do not increase your facil-

1415 ities until the demands of both require.

(p) The use of main tracks in freight service, in switching, in greater proportion than in passenger service. This weights the freight side, but doesn't amount to much; it is almost wholly confined to the use of a local freight train.

(q) The more frequent starting and stopping of freight trains, in road switching. This weights the freight side, but I do not think

it cuts much figure.

(r) Switching done by road locomotives, not represented by train mileage nor by switching mileage until one hour is reached. This is an accounting proposition, and, as I remember, only a question of overtime.

(s) I think this is an accounting proposition, wholly.

(t) I know nothing about this.

(u) Greater length of passing tracks to be maintained for freight. This claim, I think, is so, in a measure; at best, it is not a big item.

(v) Greater cost of main line due to frequent presence of switches

for freight switching. This is true, and weights freight side, but is small.

(w, x) Greater number and cost of switches for freight. This is true and weights freight side, but is small.

(y) Higher center of gravity of freight cars, particularly ore.

(Previously covered.)

(z) Greater movement of freight cars in stational work and

switching. This adds to the freight expense.

(aa) The greater damage from freight, caused by greater number of flat spots on wheels. This is not true, as speed must be taken into consideration.

(bb) Greater injury due to reciprocating motion of freight engine sideways, varying with tractive effort, and greater at

1416 slow speeds. This is not true.

He (Thompson) says it is his opinion that the freight train revenue mile is more expensive to produce on this road than the passenger train revenue mile. I doubt it very much. He says he thinks it is considerably more than twice as expensive to produce the freight revenue train mile as the passenger revenue train mile. I don't believe that.

(The elements or considerations which are claimed to add to the cost of the passenger train mile and make it as expensive as the freight train mile are stated, and the witness asked his judgment with reference to correctness.) I think the statements are correct; they are of

considerable importance.

Taking Mr. Thompson's alphabetical list of reasons to overcome excess speed in passenger while making the freight train mile more expensive, and eliminating (a) tonnage, (m) exclusive freight trackage, and (n) use of side tracks at terminals, and weighing against them plaintiff's seven items, some of them being important and some minor, I would say, without having any direct figures about it, that the value of the seven items of plaintiff's would be 60% to 75% as much as the remaining 25 of the 28 Thompson's alphabet items; i. e., if the value of Thompson's 25 items were \$1,000, the value of the seven items would be \$600 or \$750.

My testimony yesterday was that, eliminating the first of Thompson's alphabetical reasons (tonnage), the remaining 27 items were more than offset by the cost of transportation of company material in revenue freight trains; the seven items listed are 75% of the remaining items listed by Thompson. That leaves out the weight on the freight side and the speed on the passenger side, and all other things.

The causes of depreciation on a railroad are wear, decay, obso-

lescence and inadequacy.

Referring to Thompson's testimony, that passenger speeds average 27 miles and freight speeds average 16 miles per hour, and that the excess wear due to speed alone is probably not over 15%, it is my opinion that it would be very nearly twice 15%. I am taking into consideration that the train weights are the same. Speed increases stress and wear, and requires greater strength, stability and fitness of track and track structure, other things remaining the same.

It is true, in a measure, that the dynamic augment is the increase

of weight on track, due, in large part, primarily to imperfect counterbalancing of the main and side rods of the locomotive, rather than the movement per se; but, bad track is also a very strong feature, though not so great as the effect of badly counterbalanced wheels. There is

nearly always bad counterbalancing of wheels.

(The statement from the Buhl case, Vol. 1, page 427, to the effect that locomotive mileage is responsible for one-half the wear and tear of track—with which Mr. Thompson disagreed—and the statement that the cost of maintenance, depending on traffic, should be divided between the different departments of service on the basis of locomotive mileage, switching included,—which Thompson agreed would be a more correct basis than with switching excluded,—read to the witness.) I don't believe locomotive mileage plus switching is right. Switching engines very seldom, if ever, go out of the yard, where they operate on many tracks. That maintenance charge is light, and it would be very difficult to get switching engine mileage. The locomotive mileage would not be a good factor, because it does not consider weight nor speed. I have never considered that as large a ratio, as one-half the wear should be due to the locomotive; it would be different for passenger or freight and freight engine.

1418 The engine effect might be, as to the locomotive tonnage including tender, multiplied by, for passenger, 4, and for freight, 2; that would represent my opinion of the relative destructive

effect of locomotives on track and track structure.

Referring to Thompson's statement of the meaning of critical speed as being the point where the injury due to speed begins to decrease, as to whether that is the true meaning of the term, I do

not believe it, and I think his statements incorrect.

The formula for impact for bridge work is: Impact is equal to static load plus 300, into 300, divided by 300, plus L, which represents length of span in feet. I am familiar with the report of the sub-committee of the American Railway Engineering Ass'n printed in the 1911 proceedings, volume 12, part 3. The formula there proposed by the sub-committee gives the maximum impact, takes into consideration varying speeds, poor conditions of wheels, the cars and engines, had counterbalancing, poor track conditions, and all other conditions of minimum character. The average passenger train speed of 27 miles per hour on this road would be within the limits of critical speed, and would produce greater cumulative vibration and impact than the same engine on a freight train at 16 miles an hour, assuming engines, cars and track in good condition.

If all the conditions were such as you describe—everything perfect—there would be no impact. On this road, with a single span of 150 feet, which is shorter than the shortest passenger train, a passenger train at a speed of 27 miles per hour, as compared with the same engine hauling a freight train at 16 miles per hour, the critical speed would not be reached in the case of the freight train, and I would, therefore, say that the greater cumulative vibration and impact would be produced by the passenger train. I think I know a formula

that would be better than Thompson's for division of unallocatable expenses between passenger and freight. It is: Take the weight of a passenger engine and multiply it by 4; take the weight of a freight engine and multiply it by 2; take the weight and contents of a passenger train and multiply it by 2; take the tonnage of the cars behind the locomotive and tender, in other words, the cars and contents, and multiply it by one. That takes into consideration all the elements that I believe should be considered. I have never had occasion to use it since I thought it a good formula. I cannot say anybody has used it.

BERRY.

Cross-examination.

By Mr. Wykes:

This formula is known as the "equivalent ton mile formula," and is found in 1912 report of American Railway Engineering and Maintenance of Way Association. I think it proper for general application, and approve it thoroughly. It would be applicable alike to the Michigan Central, New York Central or Pennsylvania.

On a 150 foot span bridge, a 27 mile passenger speed would be

On a 150 foot span bridge, a 27 mile passenger speed would be between the two extremes of critical speed, which the tests show are between 25 and 40 miles per hour. On the 150 foot span, the critical speed would be reached, but, in the case of freight trains at 16 miles an hour, the critical speed would not be reached. I do not think that on a 150 foot span the critical speed is reached at less than 25 miles an hour; occasionally, a case has developed that it does. The damage would begin to run off, inversely, as you begin to run up from 25 miles an hour; I think there is nothing appreciable to 27 miles. When you have reached the critical speed for that span, the cumulative vibration would drop off. I do not know what the critical

speed would be on this particular length of span. I do not think it might be 22 miles an hour; the tests all show that it

seldom occurs below 25 miles an hour.

I approve of the larger part of the findings of the sub-committee of the Railway Engineering Assn., from which I quoted yesterday. Those investigations were made for the purpose of determining the truth, and not for any particular case, but for the purpose of laying down general rules as near as they could be ascertained. In saying critical speed begins at 25 miles an hour, I am assuming normal conditions of track, and not everything in good order; it is hardly ever in first class order, nor is the engine ever in first class order. If everything is in perfect order, there is no impact. If there were no imperfection in counterbalancing, no deflection of the bridge, if the ties were long enough, if there were no flat wheels, no low joints and the track was well maintained, there would be practically no impact. The roadbed of a railway is elastic—more so than a bridge.

I have never in any other case testified to rules for the division of costs. In Oklahoma and Texas cases, previously described, and to be begun, the division of costs were not made on the equivalent ton mile ratio. In those cases, they are trying to divide the costs by several alternative methods, applying the different methods to the subject as a whole; one of their bases is the speed ton miles, taking

the weight of the train and multiplying it by the speed between stations; also the revenue train miles; also cost accounting; also gross ton miles; it being the purpose to show the results by each method.

In Minnesota Rate Case, where I testified, I applied, as a proper cost for legal expenses, \$50 per mile of line. For organization, administration and general expenses, I applied \$100 per mile of line. In Minnesota Rate Case, I fixed 30¢ per cubic yard for earth work grading, and testified that 10¢ of that price was added as contractor's profit; 20¢ waz-tive centractor's price, and 10¢ was added for contractor's profit; I fixed for solid rock \$1.10 per cubic yard,

1421 and 10¢ of that price was added for contractor's profit. For interest during construction, I made a deduction of 2% of

the interest rate, due to earnings from partial operation.

In my testimony in this case, I had before me a list of the questions. Questions that were asked me were substantially in my hands as a list of questions, and I had memoranda on the margin of my thoughts in regard to the matter; I arrived in Marquette on the 8th, at 5 o'clock, and have been here to present time (16th).

The trip over the line consumed less than four days. From the time I arrived in Marquette, I have been in conference with Mr. Eldredge; at various conferences, Messrs. Tracy and Cotton, and, for

15 minutes, Lindsey, were present.

I would not use the method brought forth by Mr. Lindsey, because I know of a better plan. I would not say that I would approve of it if I did not know of a better plan, because I would have to carefully consider its merits; it would require a very careful investigation on my part. There are several others I think better. I have not passed any opinion on whether Mr. Lindsey had the wrong formula. I heard his formula stated. I think the formula I gave for impact more correct. I should hesitate to use M. V. squared for impact formula on track before I had carefully gone into it. If I were to throw a ball against the wall, I would determine the impact against the wall by M. V. squared, modified, of course, to allow for the elasticity of the object thrown. If I were to roll a ball on the floor, after making the modification for elasticity, the impact on the wall would be measured by the M. V. squared, but the impact on the floor would not be measured by that formula.

The only curves I measured were those I listed, being 18 1422 in Michigan; different elevations on the same curve were taken

at various points.

I reached the conclusion of a high degree of maintenance for South Shore. My investigation relates only to the period at which I made

it, and is not expressive of any previous condition.

I was not told that the expenditures for maintenance went up very materially in 1913 over 1912, and in 1912 over previous years. I was furnished the figure for maintenance of way per mile for one year, of \$896. I was informed that the average, for a period of five years, from 1908 to 1912, of expenditures for maintenance of way and structures was \$892 per mile. I do not know what trackage that included. I did not ask what was treated as main line, but all reports are on the basis of considering double and triple track as main line.

I was not given a comparison of maintenance by division, and no

figures to indicate actual rail replacements on curves.

Chart, Complt.'s Ex. 95, Berry, passenger train speeds, St. Ignace to Marquette, is based on running time consumed between two points without stops. If a freight train trip, St. Ignace to Marquette, were platted in the same way, it would show like waves as chart 95, but I don't think it would show as high speeds. I do not understand that the freight trains are allowed to run at that rate of speed. To determine the actual speed of a certain freight train at a certain point, it would be necessary to get the data for platting a similar curve.

If you took only elapsed time between stations, the heights of speed to which the freight train rose would not be shown. Assuming three times the tonnage in a freight train as in a passenger train, with the same type of locomotive, it would take it considerably longer to stop

than a passenger train.

I do not know the number of curves, the average degree of curvature, or the average of elevation on the outer rail of all the 1423 curves of the South Shore; the proportion of curve to tangent is small. I think the largest number would be two degrees or less, and that there are more curves of two degrees or less than of

or less, and that there are more curves of two degrees or less than of any other degree. In order to tell the amount of track damage due to curve elevation, it would be necessary to have a history of each curve, including the degree of curvature and the elevation of the

outer rail.

On curves, if there were no elevation, you would still have centrifugal force to overcome, and nosing of the trucks; it would be aggravated by having no elevation, if there was any speed to it. Even if the elevation were fitted to the needs of the train moving around the curve, the movement would cause more wear there than on tangent, the amount depending on degree of curvature; any degree of

curvature involves more wear than on tangent.

On some portions of South Shore the joints were well maintained, and on others they were not; in general, they were well maintained. They were not so well maintained on the lighter, 60 pound, rail, west of Nestoria, laid in 1887 and 1888. The joints were out of surface on the Western Division, and loads passing over those joints cause vibration, increasing with speed. Where the joints were out of surface, there would be some vibration, even from a train moving 20 miles an hour; that vibration increases the expense of maintenance, in that it aggravates the condition so that it becomes necessary to restore it to good surface. This increases expense of maintenance on both roadway and equipment; the latter to a minor degree.

From a timber bridge on South Shore I would not hesitate to get 20% or 25% longer life if used exclusively for freight than if used for freight and passenger. Even for freight service, I would not permit a bridge to go below 50% condition; 50% would be a pretty

low percentage for a bridge, even for freight service. When 1424 I said that if South Shore were engaged in freight service only I might save 25%, my percentage applied to all items appearing in maintenance of way and structures.

The purposes of ballast are for drainage, to give elasticity, to give better surface, and to permit the track to be gotten into line or surface more quickly. If you had only freight service, you would want your road so you could get it into condition as quickly and easily as possible; that would apply, whether you had passenger service or not, but in a less measure for exclusive freight. The track is not thrown out of line or surface by the slower freight train, as compared with the faster passenger train. With only freight service, I would take more chances on the track being soft than with freight and passenger.

I do not believe I can differentiate so carefully as to say which affects track maintenance the greater—tonnage or speed; they act together and affect it; one acts upon the other. It would be difficult to state what importance you would give to the tonnage or to the speed part of the combination, in exact figures. I know of no way of doing it by figures, and never heard of any one attempting it. (Witness asked whether he would disagree with other witnesses who had stated that the speed alone was not sufficient to overcome the excess wear of greater tonnage on the freight side.) I would not attempt to differentiate between the two. I am offering no criticism of their opinion.

I saw the gross ton miles, both passenger and freight, but those did not enter into my conclusions, except to be used as a matter of comparison between what results might be produced by several formulas.

Years ago, I conducted a series of tests for bridge deflection, but not with the fine instruments now used; of recent years, I have not personally conducted any of these experiments.

1425 I have made no tests of track to determine the effect of speed upon it. I know of the methods others used, but

whether they produced accurate results, I do not know.

On South Shore, assuming only freight service, I think I would get an average life of 7 or 8 years for tamarack and hemlock ties; I think I could use them in more rotten condition for freight than passenger. On trip over South Shore, I noticed a good many ties cut by rail; the hemlock and tamarack ties were cut somewhat, but the cedar much more. I saw many hemlock ties taken up that for freight service alone could be worn longer; they could have been worn longer for either service. I got the number of tie renewals for the current calendar year, 1914. The number contracted for was 333,000 for the whole road, and 290,000 for Michigan. I figured that into the gross number of ties, to find the cycle of renewal. I took it that the South Shore had from 35% to 40% of its main track mileage and siding, and perhaps a little more, on account of its ore tracks, and, put together in that way, I thought the renewals per mile were fair.

I would apply the equivalent ton mile ratio to the division of

weather costs.

On my basis of equivalent ton miles, I apply the same rule to weather as to mechanical wear costs; that depends on the volume of tonnage, and is varied by the volume of locomotive tonnage. For fences, the general weather costs and erosion do not decrease or increase faster or slower because of increased or decreased tonnage, nor in porportion in which the tonnage increases or decreases. There is

no basis, to my knowledge, upon which the weather costs can be divided which reflects anything that varies with the weather cost. I came here with the idea pretty well fixed in my mind that 1426 the equivalent ton mile basis was proper. Mr. Howard and I came here with no other desire than to give the best we had,

and advise our clients of what that was. We both believe in the

equated ton mileage, having investigated it thoroughly.

In applying the equivalent ton mile basis, the closer you get to the division in which the expenses occur, the more accurate the result becomes. By applying it by zones, you would get different results for the different zones. I don't think you could figure it down as fine as to take it by each mile. I am speaking of the difficulty of getting at the data. If we could get at it by each mile, we might get different results for each mile of the road. I doubt very much whether, in that way, you would get a different aggregate result from what we get by applying the rule in bulk, and I have never worked it out to see, and have never worked it out by divisions.

The mileage of all trackage engaged in common service or in exclusive freight service was not given me; I did not understand anything was exclusive freight trackage, except a short piece, Negaunee to Winthrop Junction. No statement and no percentage was given me of the amount of time of freight trains engaged in stational service, or of the proportion of switching mileage in freight and in passenger service. I made no analysis of terminals to determine the proportion of use in freight or in passenger service. I made no investigation to ascertain the gross tonnage of company freight, though

there is a way of doing it. It was not given to me .

In saying that the element of flat wheels in freight is perhaps trivial, or unimportant, I had in mind the excess number of wheels in freight over passenger service; taking into consideration those excess wheels in freight service, there would be many more flat spots in freight service. Whatever damage they did cause, except that added to passenger by reason of excessive speed, would be greater in freight

than in passenger.

by a freight train should all be charged to the passenger. It is necessary for each to pass the other. If there were no passenger train, or if there were no freight train, we would not have the expense; the expense is there because we have both services, and it is as necessary to get one by the other as the other by the one. It is unnecessary to make a sidetrack as long as the longest freight to get it by the passenger; you could pass with a passing track sufficient to accom-odate the passenger train. I meant to intimate that the train taking the siding should bear none of the expense due to the taking of the siding, but that it should all be charged to the other traffic, in that the freight train had already had charged to it a good share of the expense of handling it in and out.

In case of a freight train passing a freight train, the expense should be charged to the train occupying the main line, as a matter of bookkeeping. Independently of the length of the sidetrack, the passing of the two trains, freight and passenger, is a benefit to each rervice. The whole thing should be charged to the passenger, simply

because the movement has been made for the benefit of the passenger train; also, the freight train, in taking and staying on the side track. has expense all charged to freight service, so it seems to me that the expense of going in there should be properly charged to the passenger train

The Master Car Builders' rules permit wearing of wheels so that the coning entirely disappears before the wheel is taken out of service. On our railroads, we have many freight car wheels without

coning.

I should say critical speed was that at which the train produces the greatest effect. It is the point at which the maximum effect is reached and the line begins to fall the other way. Critical speed is not of necessity maximum speed, but varies with the charac-

ter of the structure and the length of the span. The longer the span, the lower the critical speed. My understanding is

that the critical speed is seldom below 25 miles an hour. I have made no tests to determine the point at which it occurs. On tests with which I am familiar, critical speed at 25 miles an hour was in-

dicated, and there were some cases below.

There is no impact, or perceptible impact, made on track in good condition, that is due to speed alone, if the locomotive is in good order and properly counterbalanced, with no flat spots on wheels; this applied to a bridge; I did not apply it to a track. The reason for the difference is that you can measure the impact on a bridge, but it is very difficult to measure it on track. I did not mean to answer that there would be no impact if all of these conditions existed on track, but that it has not been proven to be true. ground, when not frozen, is more elastic than a bridge.

Ballast is put on bridges, to guard against fire, and to make a continuous roadbed, so you can use track ties and get the same effect on the bridge that you do on a track elsewhere. A ballast deck floor on a metal bridge is to avoid the shock that occurs where you leave the roadbed and strike the pavement. It operates to reduce the im-Where a bridge is in proper shape and ballasted, impact is

greatly reduced.

Q. And that same reasoning could be applied to track, could it not, on the ground that, where it is well ballasted and the joints are well surfaced, the train conditions are such as to minimize the inequalities of flat spots and of imperfect counterbalances, that the impact disappears there also?

A. Yes.

Q. Assuming a straight track-

A. Hold on a minute. You have made an exception there to the conditions of the engine, haven't you, and cars? 1429

Q. No, I said that they should be in good condition?

A. Then the answer is ves, as I gave it.

Q. Eliminating, as much as possible, the impact from defects in the equipment?

A. That is all right.

Q. Assuming straight track, well maintained and in good condition, and eliminating all questions of curves, unbalanced drivers, depressed flat joints and flat or cecentric wheels, is it not true that the higher rates of speed, say 40 miles and above, are less damage to track than lower speeds, say those below 40 miles per hour?

A. No sir.

Q. You wouldn't apply the same principles that you apply to a bridge there?

A. No sir.

Q. If not, where is the damage due to speed?

A. Because every time that engine, even with things in perfect condition, as you speak of, strikes the joints of the rail in the track, it has a tendency to drive that down that doesn't exist on a bridge at all; and, the higher the rate of speed, the more it hammers those joints down, which it can do on track and connot due on a bridge.

Q. Is that because you cannot have perfect counterbalancing?

A. No.

Q. And cannot have perfect wheels?

A. It is because on a bridge you have got something that will not depress.

Q. The reason it occurs on joints is because you cannot have per-

fect counterbalancing.

1430 A. No sir, it is simply because a joint is the weakest point in a track, and it is subject to being pounded down more than any other portion of the rail.

Q. But, other than the joints, there would be less damaging effect?
A. Oh, yes; you would at other points, on account of the ballast continually varying from day to day its condition by the wind, by water, by something of that kind, reduce the value of the support.

Sufficient ballast, good ties and rail, and proper expenditure for roadway and track, producing fairly even track and good track condition, operates to reduce the expense for maintenance of roadway and equipment due to low track joints and imperfect track, and to reduce impact thereby.

The Master: You would say it is better economy to keep a track

in that condition than it is to get it in any poorer condition?

A. I would like to answer that in a Yankee fashion, if the Master doesn't object: They tell me that a fellow once said that he could buy the whole of Chicago for a dollar, but he didn't have a dollar. We sometimes regulate the good condition of our track by the size of our pocketbook. I know that has been the thing that has been pounded into me for a good many years.

The Master: In the instance which Mr. Wykes described, if you say yes to that, would it follow, from that, that it is more economical to keep the track in that condition than it is to keep it up in poorer

condition?

A. I think so, too; I agree with you in that. I had a great deal rather have the money to keep it in fine shape all the time, taking into consideration the traffic that it is to carry; that is the economical way to do it. too.

After we have applied these formulæ, we do not know how close to the truth we are, and there is no measure for telling, except comparatively. If on one road you have the figures for the revenue train mile, and use one or two other farmulas, taking into

consideration the elements you think are right, and they agree reasonably closely, I should say the formula that had the elements that cause mechanical wear is proper. The evolution of these formulæ from time to time depends upon judgment. That evolution has not proceeded to a point where we can say there is a consensus of opinion for the equivalent ton mile formula, or for any other, except that students of economics have been gradually sifting out those which they thought had no merit, and new ones have been springing up from time to time. One expert or railroad man selects one, and another selects another. As to whether each urges the one he is for with equal confidence, something else comes in there; some of these formulæ are selected by men who do not know what they are talking about. There are men, whose opinions I respect, who differ on the proper formula to be applied. The formula to be applied involves the judgment of the person applying it. That judgment goes to the question of whether it represents the propert elements on each side of the problem.

I think the revenue train mile basis has been more generally used, for some time back, than any other that I know of. The only bad feature about that is speed, and the locomotive; they have been trying to remedy that, in a recent formula, by using speed ton miles, but that does not cover the question of differences in locomotive effect. Everybody concedes that the effect of the locomotive on track is harder than the same tonnage of either freight or passenger cars. The revenue train mile basis also has the effect that it does not take into consideration tonnage. This is an easy formula to apply, which

is one of the reasons for its repeated use.

1432 A passenger locomotive will do more than the same tonnage of passenger cars, and a freight locomotive will do more damage than the same tonnage of freight cars. We put the locomotives

on an equated tonnage.

Every contract I have ever known between two railroad companies for trackage rights of one on the other has called the locomotive engine equal to two or three passenger cars, or three or four freight cars, in destructive effect.

(Stipulation that either party and the Court may use article from volume 12, part 3, proceedings of 12th Annual Convention of American Railway Engineering and Maintenance of Way Association.)

BERRY.

Redirect examination.

By Mr. Cotton:

Testimony has not been taken in the Oklahoma and Arkansas cases I referred to. A 50% value in bridges and trestles is not the same as 50% efficiency. A 50% value might be 80% efficiency. A 50% value represents the half way point between a new bridge and the scrap heap; it measures the time before you must put in a new bridge. A 50% value might represent a bridge you were going to

take out tomorrow, though that is an exaggerated statement, but the efficiency is not the value or a measure of the value, because efficiency is the safe bridge that will carry traffic without regard to value.

In my answers to State counsel's question, I understood him to ask me as to 50% of value. What Riggs said in his exhibit meant value, and had nothing to do with efficiency. When I answered counsel's question as to how long I would maintain or keep a bridge in 50% or

60% of condition, I had in mind efficiency.

In my comparison, where I said the seven items or elements would represent 60% to 75% as much as the 25 items of the so-called Thompson alphabet, they being treated as 100%, I considered the sleepers and diners. I took Thompson's own estimate of that, as I now remember—\$112,000 for transportation and \$55,000 for operation, equalling \$167,000. I had in mind, in addition to the value of those cars, that, if they were to be considered as a part of it, there was the interest on the investment.

BERRY.

Recross-examination.

By Mr. Wykes:

The several questions asked me on rebuttal were the subject of a conference between myself and the attorneys for plaintiff since my testimony this morning. Mr. Eldredge tried to indicate wherein I was wrong, and I explained to him wherein I was wrong.

1434

On July 17, 1914.

CHARLES P. HOWARD, a witness called by plaintiff.

Direct examination.

By Mr. Cotton:

I am 47 years of age. I live at Chicago; am a Consulting Civil Engineer. I have had about 30 years' experience in engineering. I served for two years as a rodman, on construction, on Southern Railroad; one year as Assistant Resident Engineer of construction on Frisco lines; about a year as a levelman on surveying party; four or five years as Resident Engineer of construction on the Georgia, Carolina & Northern and Chesapeake & Ohio, involving construction of a bridge across Broad river, South Carolina, and Savannah river between South Carolina and Georgia. On Chesapeake & Ohio, I had charge of double track construction, as Resident Engineer; previously I was a resident engineer on the Nashville, Chattanooga & St. Louis, near Jackson, Tennessee. I laid 55 miles of track on that line, and maintained it until turned over to operating department.

I was chief of a party of the Darien Surveys of the Isthmian Canal Commission, surveys in the province of Darien, a hundred miles east of the present Panama Canal. I was in the mining engineering business in West Virginia, making surveys and construction of inclines, tipples, etc. I was in charge of all engineering work and construction on the Deep Water Railway, as Assistant Engineer, in West Virginia, and the Tidewater Railway, as Engineer, in Virginia, about three years. On both these two railroads, we located a line from coal fields of West Virginia to Norfolk, had many locating parties at work, and constructed a good deal of the line in West Virginia.

I was Consulting Engineer at Pittsburgh. I made a joint report and reconnaisance with Mr. Kennedy, Consulting Engineer of the Wabash, on a proposed line, Wheeling, W. Va., to Connellsville, Pa.;

and made a survey for the Wabash, contemplating a new
1435 entrance at Pittsburgh. I made a report on a proposed interurban railway, south of Pittsburgh. I was employed by the
Lake Shore & Michigan Southern, for about three years, in charge
of location, as Assistant Engineer of construction. After that, I was
employed by the Illinois Central Railroad.

While on the Lake Shore, I was sole arbitrator of the value of 22 miles of the Pennsylvania Railroad east of Brookville, Pa., for joint operation. I made valuations for Lake Shore of short portions of the Baltimore & Ohio and Pennsylvania, which contemplated com-

mon use.

I was employed on reconnaisance and location of the Bangor & Aroostook Railroad, in Maine, and, later on, experience with Illinois Central, mentioned, as Locating Engineer for a line in Indiana and a line extending east from Jackson, Miss. I also made investigations into the economics of proposed grade and line changes on several divisions, two on the Illinois Central. I have since been ocrupied as a Consulting Engineer at Chicago, in which I have been engaged on one or two problems involving construction. I have had occasion to make special study of economics of railway location, for

the last ten years.

I am a member of the American Society of Civil Engineers, Chicago Railway Engineering Assn., the Western Society of Engineers, Chicago Engineers Club, and, in the American Railway Engineering Assn., for a good many years I have been a member, and am now Vice Chairman, of the Committee of Economics of Railway Location. I am chairman of sub-committee number 2 of that committee, which is charged with the study of railway operation. I am also a member of another sub-committee, which is charged with the study of power of locomotive, with special reference to the improved efficiency due to the locomotive super-heater and the automatic stoker, and in other revisions of the Manual as to the power which

1436 may be deemed necessary.

I have contributed quite a number of articles to engineering magazines. I contributed an article to the Engineering News some years ago, tables and data for railway locating engineers, which has since been republished in pamphlet form; I have also contributed articles to the American Society of Civil Engineers on subject of location, and, in recent years especially, on subjects of valu-

ation. I wrote an article on curvature for the American Railway Engineering Association; I recently published a bulletin on Grade Reduction problems, and have written other articles for magazines.

I have, necessarily, had to give a good deal of attention to matters of track construction, and I have had to maintain track during the most trying period, immediately after it was laid, until it could be turned over to the construction department, and I have had to be constantly in touch with the maintenance of way departments at various times, constantly on and about the tracks of the railway, and, in connection with the Association, have also made special studies as to operating expenses, and, of recent years especially, in regard to the question of locomotive fuel consumption, speed, time, curvature, and divisions of maintenance of way expenses, which is one of the most difficult.

I have given special study to matters affecting railway operation, its effect on track, roadbed and track structures, bridges, trestles and other structures, the cost of such operation, and the amount and causes of expenses incurred in the different kinds of business conducted by railways, especially in the items enumerated, and, in a general way, as to the total expense of operation, so as to be able to correctly prophesy what the cost of operation would be on a new line.

I have never been a witness in a rate case, in litigation involving railway valuations or the cost of maintaining tracks and railway properties, or the cost of different tracks, or for any other

1437 purpose.

I heard Mr. Berry's testimony and his description of the trip over this railroad, referring to its physical condition and the inspection of track, curves, super-elevation, etc. Mr. Berry and I were together during those four days. I participated in all of the examinations referred to by him and assisted in measuring the curves and taking the passenger train time, St. Ignace to Marquette.

We found no outer rail elevation of 8 inches. We selected the curves and examined them from the profile, having in mind the sharpest curves, where we would expect to find the most elevation. We looked for curves of the highest elevation, and, had there been any of 8 inches, we would have found it. The results for curves and speed, as given by Mr. Berry, I would testify to as correct. I think the South Shore track, roadway and structures are in fair

shape for the traffic it has.

(It was stated to witness that average speeds were, freight 16 miles, and passenger 27 miles, per hour, that passenger trains frequently, for shorter or longer distances, make 35 to 55, and occasionally, but infrequently, to 63 miles per hour, and that freight trains make occasionally, but infrequently, 25 to 35 miles per hour. He was then asked which service, per unit of weight, involves the greatest expense of maintenance of track, roadbed, and structures, both on curves and tangents, due to mechanical wear.) The greatest part of the mechanical wear, per ton, would be from the passenger trains, in my opinion, on account of the speed and the re-

quirements for better maintenance for passenger service. Generally, passenger service fixes the standard of maintenance, upkeep and efficiency. The effect on track is greater at greater speeds; as the track is never in perfect surface, and at high speeds the track blows are increased, it tends to have a worse effect on the track.

On the curves, we found considerable wear, at places, the wear being on both rails. That indicates that the wear on curves is considerably greater than on tangent; I noticed no special wear

1438 on tangents, except where I think rail had been taken from curves and put into tangent. We examined the rail, particularly on curves; I don't recall any particular examination on tangents.

If South Shore were used solely for freight traffic, I don't think it would have to be kept up as well as for both services, and it could be kept at a considerably lower standard. As to whether or not it is advisable to do that, there might be some difference; nobody knows exactly; but it is necessary for the passenger trains. The expense of maintaining it, if the passenger service were left out, would, in my judgment, be largely cut down. I could estimate that amount on equivalent ton mile basis; on that basis, if there were no passenger service on South Shore, the cost or expenses of maintenance of way, where the cost arises from mechanical wear, would be about one-half what it is now.

I read Mr. Thompson's testimony regarding the division of expenses of maintenance of way and structures resulting from mechanical wear between passenger and freight on Ratio 1, gross ton mile basis, and am familiar with it. I do not think such a ratio is proper or approximately accurate to be used in this case to divide common expenses, as it neglects the element of speed and the fact that higher speed passenger trains require better track, which are the reasons the equivalent ton mile formula was devised. That formula multiplies the passenger locomotive by four, the load back of it by two, the freight locomotive by two, and the load back of it by one, and the resulting quantities in each service produce the equivalent ton basis for the equivalent ton mile ratio. In my judgment, that ratio or basis is reasonably accurate for the division of expenses resulting from mechanical wear to way and structures.

I have read Mr. Thompson's testimony respecting his Ratio 4, time, as a proper factor for the division of maintenance of way and structures expenses due to weather stress, decay or erosion. The same, in my judgment, is not proper or approximately accurate for this case, as the respective classes of trains occupy and require the reservations for their use of different stretches of track; and, if you take the larger portion of track occupied in that sense by the passenger trains and multiply them by it, you would get essentially differ-

on any basis.

(Objection to strike out witness' answer because predicated on misunderstanding of Thompson's testimony, as Thompson does allow

ent results from Mr. Thompson's, provided time theory were correct

for a suitable amount of track in his judgment, as required for the needs of the trains.)

If the passenger trains were slowed to the freight train speeds, with the same rights as now, they would still occupy the track in a more intensive way; they would then average the same use, in point of time, as the freight trains. I think Mr. Thompson referred to a section or block as being used by a train, and assumes that the same length of track was used by each train, passenger and freight.

I would not consider Thompson's Ratio 4 as proper or accurate for dividing maintenance of way and structures expenses between passenger and freight. I never heard of it before as a ratio for dividing expenses. I do not consider Thompson's Ratio 4 proper for use in dividing unallocatable property between passenger and freight services, for reasons already stated. That would not be accurate, even

assuming his time basis correct in principle.

I do not know which would the more nearly accurately measure
the division of common unallocatable expenses of mainte1440 nance of way and structures on this road, as between passenger and freight, the revenue train miles on the one side, or
the gross ton mile and the time on the other side. I have never given
any particular attention to the division of wear stress on railroads,
for the reason that I have divided mechanical wear on equivalent ton
miles and the weather stress according to the miles—so much per
mile. I had no reason to divide between passenger and freight, and
the only reason for doing that was to take into consideration the extra
weight and speed, as to its effect on track. The equivalent ton mile

basis I would use for dividing mechanical wear expense of mainte-

nance of way and structures.

Locomotives cause greater destructive effect on track, bridges and trestles, and passenger locomotives at higher speed cause greater destructive effect on track and track structures than freight locomotives at slow speed, if they are anywhere near the same weight. I have never observed the side motion of locomotives at slow speed, with heavy loads, causing stress on track and track structures, but if it exists, as it may, I do not think it important, as the blow would depend very much on the speed of application, and, as already mentioned in this case, all the cars behind the train would be going at slowest possible speed. In my opinion, the counterbalance on the locomotive is one of the most important features of damage, both to track and bridges; that is very important at high speeds. son has not taken into account this higher speed effect on imperfect counterbalancing; I never heard of perfect counterbalancing, and my information is it cannot be done. Counterbalancing for a certain speed may be approximately correct, but, when you go beyond that speed, the unbalanced force becomes very destructive.

The causes of depreciation are wear, decay, obsolescence and in-

adequacy.

1441 It is the consensus of opinion among civil engineers that speed increases stress and wear, and requires for track and

track structures greater strength, stability and fitness, other things

remaining the same.

A rail has an elastic element; every element has an elastic limit. But, in general, you don't speak of the elastic limit of a track being reached; at least, I don't think it is ever used in that way. He (Thompson) might mean that, when a track got dangerous, of course, it doesn't make any particular difference, the exact terms you

use, provided you get the sense.

(Witness' attention called to quotation from Buhl case, where it was said that Woodlock and others held that that part of the cost of maintenance depending on traffic should be apportioned between different departments of the service based on locomotive mileage, switching included, and that many others held that the locomotive mileage alone is responsible for at least one-half the wear and tear of track, with which Thompson disagreed, and his judgment was asked about the paragraph.) Nobody knows exactly how much greater the locomotive effect is; as a matter of fact, it would vary with different locomotives and cars. But, it must be remembered that, when Wellington wrote that, both locomotives and cars were considerably lighter than now.

In the equivalent ton mile formula, the locomotive has been given double the weight, as being as near an approximation as we could get with our present knowledge of the subject. I have recently had sent me an elaborate blue print, in an effort to divide costs, which took a locomotive as weighing three times as much as the load behind it, but it is not possible, at this time, to make very narrow distinctions, and, of course, by assuming the locomotive as more than twice the equivalent of a given weight of cars, it would accentuate the differ-

ence between that and the gross ton mile formula.

Wellington's book, which contained the statement quoted by Thompson, was written 25 years ago, and the last revision was 10 or 15 years ago. The statement of Thompson, that the critical speed is the speed at which the injury begins to decrease, is true. There is nothing in Thompson's statement that "in the case of very high speed trains, the injury to the rail joint is less than in the case

of lower speed trains."

If the track were absolutely straight and level, and smooth, and the e were no irregularities whatever, and if the locomotive and the cars had no unbalanced portion, so that there would be a smooth, uniform speed, just as if a perfectly adjusted machine were gliding on greased rails, why then, as I understand it, both by tests and by theory, there would be no jolt or jar, whatever, and there would be no effect of impact, going on a bridge. There would be just that due to the absolute weight; but, as a matter of fact, that is never attained under any conditions. In bridges, it can be attained, to a certain extent, where the track is good, and especially where they have a slight camber or bend in the track, so that, when a train gets on it, its weight presses that down and makes it more nearly level; that can be attained, to a certain extent, but the effect on track, of course, is a question of irregularities and blows, occasioned, not only by the roughness in the track, but by the counterbalance in the locomotive,

and blows of the wheels of the cars on these different low and high spots. One of the common track defects is low joints, and practically

every track has some low joints.

On a single bridge span of 150 feet, a passenger train at 27 miles an hour would cause greater cumulative vibration and greater impact than a freight train at 16 miles an hour. A passenger engine might reach the critical speed at 40 miles per hour; a freight train could not by any possibility reach the critical speed. The impacts due to counterbalancing are practically none, up to 12 miles an hour, and very low for speeds of 16 miles.

I have already given you the fact that the jar produced by a heavy freight car was not very great under about 40 miles

per hour.

1443

HOWARD.

Cross-examination.

By Mr. Wykes:

I am practically a partner of Mr. Berry's. I heard practically all his testimony. I am familiar with practically all of it. Mr. Berry testified to some things I do not know about. I have no specific criticism of Mr. Berry's testimony upon the subjects regarding which he testified. The information received by Mr. Berry and myself from company officials was received together, usually, so I had the same information he had. I asked questions whenever I thought it useful. Anybody that could tell me anything, I asked them questions which I thought pertinent to the inquiry.

I think you could cut the expense on the South Shore by taking off the passenger service. To say what expense would be left would be a guess, and involve my making an estimate on the whole cost of operation in each service. I do not know whether it would be 5% or 50%, and it would be simply a guess; it would be as much so as for me to give you my idea as to the relative expense of all the passenger

and freight service on this line.

Limited to the expenses of maintenance, I do not really know; it is just simply a wild guess. I would have to guess on the basis of train miles; the mechanical wear portion that I have examined would be too small a proportion of the service. It would be the merest hearsay, based on statistics of what different roads cost per mile for freight and passenger, and they do not give those statistics. Sometimes I have taken the average cost per mile on a railroad as representing something like the ratio, and again I have taken it higher for freight service.

Our examination of South Shore related solely to 1914 and the conditions at that time, and not to any previous time. I do not know the condition of the property in previous years, and did not investigate the expenditures of 1913 and previous years. The extent of perfection in which a railroad would be maintained would depend upon the speeds made. If, in a particular year or through a series of years, the expense went up very much above the average of

previous years, one reason might be that speeds had increased, or another might be increase in tonnage, prices or increased expenditures. If the speeds were increased materially, I think it would show an in-

crease in cost of maintenance.

Bridges are usually designed for tonnage. If I were building a railroad today, and providing for new bridges, I would take into consideration the needs of 20 years in advance, providing for the prevailing type of locomotives, and also for changes in weight and conditions of locomotives, as indicated by practice of other important roads. I understand the South Shore's new bridges are Cooper's E 50 loading, which, it is maintained by some, are good enough for any locomotive that is likely to occur; it will take care of the stresses that the future gives evidence of. I believe the greater number of steel bridges have been taken out because of increase in loading. I examined but one wooden bridge particularly.

I know nothing about the annual expenditures of the South Shore on its bridges. I saw one figure of the annual expenses in one year, but could not say whether it was \$1,500,000 or \$2,500,000. I know nothing about the expenditures of the South Shore for bridges that would be due to speed, or the part due to passenger traffic. If it were a question between speed of 35 and of 60 and 65 miles an hour, I think you could cut in half the allowance for impact, and that allowance for impact would cut the live load on which you would base

the weight of a bridge about 23%, and that would mean a saving in cost of 10% or 15% on a steel structure, because the weight could be made less if you were certain that those speeds

would not be exceeded.

I did not mean that I would favor building bridges for exactly that traffic, for people might want to own a road, good not only for immediate purposes, and which they could dispose of. Assuming we were going to devote the South Shore exclusively to freight business, and I was called upon to replace these wooden trestles and provide for the needs of today, and for a good railroading and the needs of the future, I would put in E 50 bridges, which is a good bridge and good practice. That is South Shore standard.

It was not indicated to me what amount the South Shore was spending for ballasting or ties; I do not know what the expenditures for ties or track laying or surfacing for the past 5 or any one of the past

5 years has been.

I saw equivalent ton mile formula before it came out in American Society report, as I was a member of the committee formulating it. I don't think it had been studied more than a year previous to the report; that is, I do not think there had been any specific study applied to make any formula, unless it might have been in the minds of some of the members of the committee before that time. The members' experience extended over the time of their acquaintance with railroads. I think these tests made for bridges apply, in a great measure, to track; I don't know of those being considered by anybody. I did not consider them in my work on the formula.

I do not know what particular railroad is mentioned in the report; I do not believe I signed it, but I was a party, and agreed, to it. The association has not adopted it. I do not know that any railroad has adopted it, or of its use in any rate case. It was up for discussion before the Association. When a report is presented in an an-

1446 nual convention, they generally discuss it; generally, they do not adopt a whole report, but, if they see fit, they adopt general conclusions. The conclusion presented in the report of the committee may be adopted, or it may be modified and adopted. I think there was a motion to adopt the equivalent ton mile formula. The question came before the Association as to whether it should be adopted or not, and they didn't adopt it. I think Mr. Lindsey participated in the discussion, and was against the adoption of the formula.

Where I applied it, I was not interested in what the division between passenger and freight expenses was. I never used the equivalent ton mile ratio for weather stress items. I would not approve of it for weather stress items, unless I had investigated to see some reason why it would apply. It was intended to take care of that. I did not approve of it for the division of property between the two services.

I cannot tell you which character of depreciation is the most important, wear, decay, obsolescence or inadequacy. The depreciation due to inadequacy would, I think, in some respects, be very considerable; e. g., wooden bridges, ballast and steel bridges. In general, the life of a wooden bridge or trestle is 8 to 10 years, depending on the climate and the timber used.

The term "critical speed" is not applied to track. Track, you might say, is composed of a number of short spans, 2 to 4 feet apart; if the critical speed is not reached on spans of 50 or 70 feet, it would not be reached on spans of 2 to 4 feet. I believe, in general, the crit-

ical speed on track is when the locomotive jumps the track.

I know of no way of measuring the effect of speed on track, except the tests of the recent report of impact on bridges, and I think that largely applies to track. The counterbalance of the loco-

I told you sometime ago, the two locomotives in that report (American Railway Engineering Association, upon equivalent ton mile formula) show about 60% increase in the static load, due to dynamic augment. With the variety of different kinds and types of locomotives, and of different weights of cars and loads, it is difficult to say what effect should be attributed to speed and tonnage. I think, possibly, the ranges within which it would fall could be obtained. At speeds below 10, 12 or 15 miles an hour, the speed would cut little figure; I do not know how much; I know no way of calculating it. I think it is largely the result of experience and judgment based on experience. The amount of damage done by speed depends on the conditions of perfection of track.

The conditions of counterbalancing and the method of construction of equipment all enter into it, as well as the intention to have the equipment in good order, the amount of flat spots, and many kindred items. If everything were in ideal condition, and there were perfect surface and no low joints, you could get rid of that locomotive counterbalancing, and there would not be any danger. If

everything was in ideal condition, there would not be any impact from speed alone, except on grades and curves. Theoretically, there would be no increase in weight due to the dynamic augment. One of the reasons you can never get those ideal conditions is because there is always some give in a track and the ballast is never perfect. One purpose of the ballast is to evenly distribute the weight, and that is the reason why on high speed railroads you put in more ballast and put your track in better condition, and try to approach ideal conditions. It takes money to keep it up.

I did not consider the results of much value, because the amount of ballasting in the statistical figures would vary from year to year.

The ballasting would fluctuate with the conditions of the ground, and the comparison was based upon expenditures, with nothing to indicate the character of ballast or the costs

of different kinds of ballast, which vary.

I do not know how closely the equivalent ton mile basis would come to expressing actual conditions. My judgment is that it is a fairly accurate measure,—the most accurate that I know of,—but I do not know the limits of accuracy or error, and I do not know any one who does. The equivalent ton mile basis was recommended by the committee for general application; I do not remember any exceptions. I would apply it to the South Shore, but don't know as I would apply it to the New York Central.

I have a statement here, taken from Mr. Thompson's report, giving the locomotive weights in both services. The only way I could get the ton mile average would be to divide by the train miles. I did not do that, either for passenger or freight; that would not affect the formula, because the total weights would be multiplied by the

same thing.

HOWARD.

Redirect examination.

By Mr. Cotton:

I do not know whether the equivalent ton mile formula was rejected by the Association, or that it was referred back to the committee; the committee this year is charged and directed to investigate the subject.

HOWARD.

Recross-examination.

By Mr. Wykes:

I do not know whether the committee is especially considering the equivalent ton mile formula now or not; it is considering all the information it can get on the subject, and, if the information

1449 checks that formula, it would be the formula selected. The general investigation is to determine the relative cost of passenger service, as it affects maintenance of way expenses. The report may not be a formula; it might be a method.

1450

On July 20, 1914.

WAYLAND W. WALKER, a witness called by plaintiff.

Direct examination.

By Mr. Cotton:

I am 46 years of age. I live at Duluth, and am Vice President and General Manager of plaintiff, having exclusive charge of the departments of operation, traffic, maintenance, and construction. I have been connected with plaintiff since 1890, (1900) as Traveling, Assistant General, and General, Freight Agent, and as Vice President and General Manager, having during that time given my time and attention exclusively to its service and its railroad. Have been Vice President and General Manager since December 1, 1911, since which time all construction, operation, maintenance and traffic has been under my direction. I have been in railroad business 30 years; with Grand Trunk, Great Northern, and Sioux City & Northern, up to 1900.

In my judgment it costs South Shore 20% to 30% more to keep its railroad in condition to operate passenger trains over it than it would if we operated freight trains exclusively, as we must provide for better track in all features, such as ties, rails, ballast and alignment, to provide for faster time of trains necessary for passenger traffic. If we had only our present freight traffic and service to maintain, the operating expenses would be between 20% and 30% less—

nearer 30% than 20%.

The South Shore water front at Houghton has been used in the past and is now usable. It is necessary for the uses of the company, taking into account the possibilities of immediate use and the future; we hope to be able to use it soon. We expect to get in people to handle stone over it from quarries on Portage Lake; negotiations are now pending. I consider this water front very necessary, and wouldn't want to sell it. In the past, it has been used for handling trap rock from the mines, used in crib work for the canals, largely;

part of the trestle is left on it.

here. Diners were put on after I came; before then, meals were served at lunch counters, at different points, and by Wagner cars. It was then the practice to stop the trains to permit passengers to eat. We have had diners about 15 years. Sleeper and diner services are, in my judgment, a necessary part of passenger service; the people have come to regard those as a necessity, and the railroad not furnishing them cannot expect to enjoy traffic, except between points where people have to travel over that railroad. The people in Michigan use the sleepers and diners largely. I would say they are necessary for passenger service wholly in Michigan and serious loss of business would result from abandoning them—I should say 50 per cent.

People travel because of the facilities they find; passenger business has been built up largely on that service. An example is the

considerable traffic we have between Copper Country and Lower Peninsula, and that, Houghton to Chicago, of solid steel passenger trains with diners. If we did not furnish sleeping and dining accommodations, via Mackinaw, we couldn't expect any first class busi-The Copper Country situation is governed by competition with the Copper Range and C. M. & St. P. On business between Soo and points east, and Duluth and points west, we couldn't expect any first class business if we took off sleepers and diners. No doubt, the same would be true as to business between Detroit and Houghton and other points, and Marquette and others, in Michigan; we would lose a big percentage of that business. That would be true for passengers whose destination was points in Upper Peninsula.

The passenger rates and business are competitive in the whole state of Michigan. From Duluth, we have competition to every point of importance on our railroad. Through service by boat increases in efficiency every year; they are active competitors for all our business from Duluth to water points, and also to our short points out of these water points; e. g., boats leaving

Duluth, stopping at Houghton, carry many passengers for such points as Baraga, L'Anse, and places where the boats Many people go from Duluth to Marquette and use our short roads to Ishpeming and Negaunce and other centers of importance. Marquette is competitive with water and also with the all rail lines from Chicago. The line, Duluth to Soo, is competitive, not only with water, but with the Soo Line, whose railroad is from Duluth to Soo, on which they make as good time as ours. are subject to water competition five or six months of the year. These competitive conditions apply in a more exaggerated way for freight, as the boat lines do freight business for about eight months.

Every community of any size on the railroad is either located on, The same is true of other communities in or competitive by, water. respect of rail lines. Between Duluth and Soo, our line is crossed by 16 railroads. That is nearly always a disadvantage, as we are forced to surrender our business on the short haul very often, where we We get a could get a long haul if the railroad were not so near. benefit in return for that in some cases, but it is negligible. I don't think any railroad can get any rate they want; other elements than competition enter in.

Ore is our heaviest commodity, 5-year average being 41.7% of This is competitive with other lines; some ore goes to Newberry, but this is competitive in the sense that that furnace must have a corresponding rate with furnaces located elsewhere, to enable them to sell at a profit.

Stone, sand and other line commodities produced 9.36 per cent of the tonnage in 1913; it consists nearly all of limestone from Fiborn. This is sold at Soo, Ont., Duluth, Superior, and the Cop-Michigan. per Country, and the rate is governed entirely by the commercial competition of other limestone producing points. This exists in Michigan, principally at Alpena, where U. S. Steel cor-

poration receives great quantities of limestone. We have 1453 tried to increase this rate, but it seems, if we did increase, it

would result in shutting down the property.

Grain and flour produce 2.91% of the tonnage; they originate at Minnesota and Wisconsin points, seeking a market east, via Soo and Mackinaw, making it competitive with the lines through Chicago, Milwaukee and Manistique. We are no factors in the making of these rates; the basis is really established by water competition. An arbitrary rate above the water rate basis is made by the conference of lines. On grain and flour to Iron and Copper Country, we are subject to competition both by rail and water.

Bituminous coal, 6.18% of our tonnage, is largely handled through Marquette to mines about Ishpeming and Negaunee; the rates are made to compete with shipments through Escanaba and Gladstone. An advance cannot be secured, unless an advance is made from the ports mentioned. This coal originates outside Michigan, is under I. C. C. jurisdiction, and we can get no advance on that or other rates

except by its consent.

Iron, 1.39% of our tonnage, is largely pig iron from Newberry, and rates are produced by commercial competitive conditions, and, to allow the furnace to operate, it is necessary to make very low rates.

Rates on other commodities making up the balance of our tonnage consist of tonnage destined to such points as Soo, Marquette, Ishpeming, Negaunee, Houghton, and points north, Duluth and Superior; these are highly competitive with rail and water rates, the rates from Mackinaw City and Soo to Duluth being the maximum that can be exacted from intermediate points. These rates are produced by the lines operating through Chicago to the head of the lakes, and this railroad cannot advance them except when a uniform advance is made by all lines involved.

On copper, we enjoy the haul only during closed season; when navigation is open, it all goes by boat, the rates for

which are one-half ours.

Our natural resources are minerals and forest products. Other railroads reach the mines from which we get ore, and a great deal of it goes by other lines. It is problematical whether we will keep that business or not. We get copper shipments for four months. For fiscal year 1913, lumber and forest products was 28.79% of our tonnage; that business is in competition by water and rail. The volume of forest products handled by our railroad has been increasing as the result of cleaning up the land. The white pine was first taken off; now they clean the land of every commodity, inferior timber and forest products necessarily making lower rate. Owners of timber along our line control railroad or water facilities; the Mather interests have railroads through Marquette County, and east to Evelyn, on our line, in which they are active competitors; the L. S. & I. is competitive, Ishpeming to Marquette, and the M. M. & S. E. east as far as Evelvn. There are the Mather lines.

The competition to which I have referred controls and fixes our freight rates on the systems and in Michigan; the competition of the north and south lines tapping our line at the different points establish a condition of rates on forest products that controls the rates from both local and competitive points on our railroad, particularly on lumber, as lumber rates are made on zone basis, and whether a mill is

located on our line or that of a competitor depends upon whether we

give the same rate as the competitor.

The water rates affect lumber transportation to Chicago; we have established a rate of 2 cents per hundred pounds on lumber to Chicago less than we have from interior points, to meet this water competition, which will always be there. At the rates at which we carry, we have to make some profit, or we would stay out of the business.

There has been some slight growth in agricultural products over our line. We have a 1% ruling grade, Duluth to Soo, which costs us 25% to 30%, in my judgment, more to operate than

if we could reduce it to .5%.

The passenger traffic fixes the standard of maintenance and upkeep. I think our service compares very favorably with any of the railroads of which I have knowledge. Considering the extent of the traffic, I regard the passenger service as efficient and well maintained.

WALKER,

Cross-examination.

By Mr. Wykes:

The water front at east Houghton yard was used six or eight years ago. A trestle was built, which is, in part, still there; we are now considering having someone else use it. Since that time, there has been no use of the water front, in the shape of the use at that time, except that we expect to put some tracks over there; if the water is to be used, improvements must be made to fit the business; boats can-

not land at our property without a trestle.

We consider dining car service necessary at all points where the journey covers the period of a meal hour; a good many (several) of our trains do not carry diners. I think the larger portion of them have diners; they are on 7 and 8, and on 1 and 2, which are big trains—our best trains. We have diners on both Chicago trains; we have diners, except west of Nestoria, on every train running any distance on our railroad. On the 14 trains between Ishpeming and Marquette only 1 and 2 have diners; these are through trains. West of Nestoria, we have two trains a day, each way, with a diner on one of them, Duluth to Bibon and return; there is no dining service in Michigan west of Nestoria. I should say trains carrying diners have a greater mileage than trains without; we haul a diner to Mar-

1456 quette, and are through serving at Newberry; we take diner to
Marquette to go back next morning. Between Negaunee and
Houghton we have four trains each way per day, and two trains each

way taking dining cars.

Between Marquette and Soo we have two trains each way each day, both with diners, part of the distance; 1 and 2 have them Marquette to St. Ignace, and 7 and 8 Marquette to Soo. The mileage of trains on which diners are hauled is greater than that of those which haul no diners. • I don't meen the diner mileage; we don't haul the diners the same distance that we haul the trains. The two

trains to Copper Country having diners are the St. Paul and North-

western trains, and our 1 and 2.

At nearly all the 16 points where our road is intersected by other railroads, we transfer and receive freight, the volume of which is large; we are permitted, in that way, to reach points that we could not reach if it were not for those points of interchange, both in originating and delivering business. I have never made a computation to determine the proportion of business that we wouldn't reach or receive if we didn't have those interchange points. It is impossible to arrive at such computation, because of the fluctuation in traffic, commodities and conditions.

The South Shore line, Soo to Duluth, is 60 miles shorter than Soo Line mileage. Their running time of trains is pretty close to the

same as ours; their ruling grade is .45%.

Escanaba and Gladstone to Ishpeming and Negaunee is 60 miles, as against 15 from Marquette to Ishpeming and Negaunee. Coal coming up that way has a considerably longer rail and shorter lake haul than coal coming via Marquette. Lake rates on coal to Escanaba

are cheaper than to Marquette. Our coal rate is not made in combination with the water rate. I cannot give you the comparative rate, Gladstone and Escanaba with Ishpeming and

Negaunee, and from Marquette to latter two.

I don't know proportion of South Shore's business between points local to its line. It would be quite a long computation to find it. I should say it was inconsiderable between strictly local points, except on logs to mills. I couldn't express it in a percentage, with any detniteness. By strictly local points, I mean that originating and delivered on the line. In saying that it was inconsiderable, I did not take into consideration that which arises on other roads in Upper Peninsula and is delivered to local points on this line. There is not a very considerable amount of business originating on South Shore and going to other railroads for Upper Peninsula delivery. I could not fix the proportion of that business.

Where you have the facility, train equipment, etc., you can add business without expecting the same return from it as if it were the first business of the road; that is the policy of all railroads. We try to make rates so as to make some profit on each commodity that we

take.

WALKER.

Redirect examination.

By Mr. Cotton:

Trains 3 and 4, with C. & N. W. equipment, except mail and baggage cars, serve from Houghton to Ishpeming; they serve as South Shore trains from Ishpeming to Marquette; Northwestern diner on that train serves the Marquette and all intermediate business. The same is true of C. M. & St. P. Chicago trains 103 and 104, between Houghton and Champion.

(Stipulation that the latest maps of the Michigan and Wisconsin Railroad Commission may be referred to by either party with like effect as if in the record.) I don't think our line sells tickets in connection with the steamship lines between Duluth and Houghton, and Duluth and Marquette. (This witness was later called to testify before the Court.)

1459

On July 21, 1914.

RAY BROTHERTON, a witness called by plaintiff.

Direct examination.

By Mr. Tracy:

I live at Negaunee, and am Engineer in charge of Cleveland Cliffs Land Department. I prepared the following statement showing lots in Negaunee and Ishpeming, area in square feet, assessed value, and assessed value per acre, taking the areas from survey maps, and taking the assessed values from assessment roll; the figures are correct.

1460	Area in square	Assessed	Assessed value
Description.	feet.	value.	per acre.
City	of Negaune	ee.	
Iron Plat (or Pendill	Plat):		
Lot 103	5,250	\$600.00	\$4,966.00
Lot 104	4,500	500.00	4,835.00
Lot 105	625	300.00	20,908.00
Lot 108	625	300.00	20,908.00
Lot 119	1,225	300.00	10,454.00
Lots 61, 62, 63 and 64	10,125	4,000.00	17,205.00
Maitland Addition:			
Lot 9, Block 2	5,400	500.00	3,920.00
Lot 10, Block 2	2,400	500.00	8,712.00
Lot 11, Block 2	3,250	300.00	3,920.00
Lot 12, Block 2	4,000	350.00	3,484.00
Lot 13, Block 2	4,650	400.00	3,736.00
Lot 14, Block 2	5,300	450.00	3,659.00
Lot 15, Block 2	5,950	600.00	4,356.00

City of Ishpeming.

Original Plat:

Sale price, less building.	Sale price per acre.
	87,120.00 32,234.40
	less building.

1461 I figured the assessed value per acre, and the computations are correct. Lot 6 of Nelson's original plat is the property recently sold to Gately brothers, and lots 133 to 136 inclusive are the post office property. I got the sale prices on those descriptions from Mr. Tracy.

BROTHERTON.

Cross-examination.

By Mr. Wykes:

Lot 103 is a full lot; lots 104, 105, 108 and 119 are fractional, and belong to the Cleveland Cliffs. On lot 105, the railroad takes all of the lot except 625 feet. I have applied the assessed value of \$300 to that 625 feet, and the same for other fractional lots.

We have known for several years that they were assessed as full lots, but have made no protest. There are right of way posts at the edge of the highway showing right of way line. Lots 61 to 63 are

full, and 64 is a fractional lot. They are all vacant.

Lots in Maitland's Add. are 2,800 feet east of the depot and north of the old abandoned track. The Gately description, lot 86, had a structure on it at the time of sale, I think. It is the northeast corner of Main and Pearl. In getting the area, I figured the lot exclusive of streets. There is a street of 50 feet on one side and 60 on the other; the part exclusive of the streets is .08 of an acre; it is one of the good corners of the town. I deducted \$500 for the building, under Cooley's testimony.

Lots 133 to 136 of original plat lie between Bank St. and C. & N. W. right of way, and I don't know whether there were business places on them or not. In all my computations, I included simply the land inside the lot line. On lot 136, to include the street would

add 6,700 square feet, approximately, and makes the price per acre \$22,651.20; including the streets in the Gately description, lot 86, makes the assessed value \$40,510.80 per acre, reduced from \$87,120. The assessed value of lot 86 is \$6,500.

1463

On July 21, 1914.

JACOB P. WERNER, a witness called by plaintiff.

Direct examination.

By Mr. Eldredge:

I live at Marquette; am in business there. I am one of the five City Commissioners. I own real estate on Front St. I have bought and sold real estate in Marquette, and think I know its value in the business part of the city. For the land, without buildings, on southwest corner Front and Washington, 55 feet on Front by 127 on Washington, I would consider \$350 a foot front on Front a fair price.

WERNER.

Cross-examination.

By Mr. Wykes:

I purchased property below this, across the street, about 12 years ago. I don't know of any sales anywhere near this price of \$350 a front foot on Front. I base the valuation on what I paid for my property and what I consider it worth, and upon the rent return I could get. I paid \$7,500 for 32 feet, 127 feet deep, with a foundation and cellar excavation.

I don't know what the corner in question could rent for; you could hardly figure the value of a lot on present buildings. It is the best corner in town, and the buildings are not good enough for the lot. It is better than any of the other three corners. It is the best

piece of property in town.

1464

On August 11, 1914.

F. J. BACHELDER, a witness called by defendants.

Direct examination.

By Mr. Wykes:

I live at Madison, Wis., and am Engineer of Track Inspection of Wisconsin Railroad Commission, having been connected with the Commission about six months; my last previous employment was as. Division Engineer of the Baltimore & Ohio, being such from 1905 to 1914. I have been employed by other railroads.

I took civil engineering course in University of Wisconsin, and am a member of the American Railway Engineering and Maintenance of Way Association, having been a member of the committees

on tracks, on bridges, and on records and accounts.

From August 1st to 6th, 1914, I made a trip of inspection over South Shore. We covered practically the whole main line, except a short distance on the west end. Altogether, we rode over 800 miles on passenger trains, rode a distance on two freight trains, and walked about 25 miles of the track. Messrs. Atwood and Bristol were with me, except part of the time, and they made all the trips with me on foot.

We observed the effect of traffic on ties, rails and the roadbed, in general—of the entire track structure, including bridges. On curves, we observed the elevations, rail wear, and the effects of the various traffics; we observed the train speeds, taking them between mile posts, and getting the time between terminals. I observed the amount of wear on track on curves and tangents, and made comparisons. On B. & O., I did work in testing various materials with a view to determining the most efficient material to use and the effect of traffic on the material, and among them were studies of rail wear,

taking the rail wear on different degrees of curves and testing different kinds of steel rail. The tests were chosen on the tracks where the heavy tonnage passed; it was not a study of the traffic, but of the rail wear, and we selected the tracks over

which the heavy tonnage passed,

I covered the South Shore line with sufficient detail to express an opinion upon whether the road is maintained in a degree of excellence in excess of what would be required if the traffic were limited to freight, and I have an opinion upon that subject. I do not think the maintenance of the South Shore is of too high a standard for the freight traffic they have. If the track is allowed to get out of surface, it becomes harder for a train to pull an equal tonnage over the poor

track than over a track in good surface.

There is undoubtedly an added wear on equipment from poor track maintenance. It takes more coal to haul loads over poorly maintained track and over rough track—more to pull the same load; it requires greater amount of power, or causes reduced tonnage. The only thing on the South Shore which, in my judgment, would be done for the operation of passenger trains would be the expense in painting buildings for appearance before it would be necessary to paint for the protection of the lumber. In track, the one added expense, for passenger service only, would be around station grounds, where lawns would be trimmed neater, and along the track they might cut a grass line. I did not see a grass line in many places; they were working at it. A portion of the trimming of weeds from the ballast, for neatness, would be for passenger traffic.

I recently examined exclusive freight tracks of the C. & N. W., on the St. Francis cut-off, between Milwaukee and Chicago; that freight line is of a higher standard of maintenance than the South Shore. I am familiar with the exclusive freight lines of the B. & O., and

while the wear on those is heavier than on South Shore, the standard of maintenance was about the same; that was the Medina cutoff, of about 8 miles—a low grade line, used for freight trains exclusively.

In my inspection and investigation of South Shore, I had in mind the question of which traffic produces the greater wear on the track structure, and, in my judgment, the greater cost for maintenance due to mechanical wear is the freight traffic; it is considerably greater.

You can compare the damage due to tonnage and to speed, by taking a district of heavy freight tonnage and comparing with it a district where it is largely passenger traffic; you would compare the damage to ties and to rail, especially on curves, and notice whether the flanges had cut into the head of the rail more on the freight or the passenger. On tangents, on very heavy traffic lines, the rail wear is perceptible. You would take the amount of wear for a month, or some stated time; that is about the only basis I know, except, with a freight traffic line, you could observe that the wear was very much greater on that line than on the passenger line.

On the C. & N. W. line, from observation of the freight line and the passenger line, it seemed to me that the freight traffic had the most wear. You know original section of the rail, and can get the amount of wear after the rail has been in track for, say, six months, and you can determine the wear per month, or for any stated period.

I took rail sections on the C. & N. W.

On South Shore, we took a section of rail showing wear, in the district between L'Anse and Baraga, which is the district of their densest passenger traffic, and that showed very slight wear; we took a section between Eagle Mills and Marquette, where they handle very heavy ore tonnage, and there the wear was very heavy; the wear was on a

percentage of 70 for the freight line and 30 for the passenger. The freight traffic was very much heavier between Eagle 1467 Mills and Marquette than the passenger traffic, and the passen-

ger traffic there is somewhat heavier than between L'Anse and

Baraga.

In going over the line, we took care to observe the curves, the degree of elevation and of curvature; we took measurements of elevations on about 13 curves. I also, on other curves, observed the riding quality of the track from passing over on the trains. You could thus observe the approximate elevation in the effect on the track. We took measurements where we walked over track, between Negaunee and Ishpeming, between Eagle Mills and Marquette, between Baraga and L'Anse, and at various points where we stopped a sufficient time when on freight trains.

In the 25 miles we walked over the track, we inspected the curves, to ascertain the amount of flow and wear due to the superelevation of the upper rail. There was very little flowing of the Where it does exist, it is usually on the lower side of the curves, indicating super-elevation; there is a small amount of that.

I have platted, on diagrams, the amount of flow found.

I inspected the ties, to ascertain whether they were taken out on account of wear or weather causes; in the district of dense passenger traffic. Nestoria to Houghton, it appeared to me the larger percentage were taken out because of decay, and in the district of heavy freight traffic, while there were certain taken out on account of decay, a much larger proportion were taken out on account of the ties being cut or worn by the rails. I took pictures to indicate typical instances of rail cutting of ties. (Photographs produced and marked Defts.' Ex. 31, Batchelder.) I took photographs to indicate typical conditions of ties taken out due to decay. (Photographs marked Defts.' Ex. 82, Batchelder.) On the parts of the road I examined, the cause of tie renewals would be the decay and the cutting of rail, about half and half. It looked to me, from the amount of work they

had done, that the maintenance was increasing—the degree

1468 of maintenance.

On B. & O., comparing the tonnage line, over which the heavy freight traffic moved, with the line over which passenger traffic was done, the evidences of greater wear were on the freight line; that line was not engaged in exclusive freight. We took rail sections in our study of the problem on the B. & O., to indicate effect

of tonnage movement.

For the purpose of study of rail wear of B. & O., we took the track on which the heavy traffic moved; the line was double track; the heavy traffic moved on the eastbound track, and the empties were returned on the west bound track, and the rail sections were taken on the eastbound track. We took that track for study and for sections, as it indicated the heavy wear, and the other track didn't make as good a location for our test, because it didn't have the heavy wear. Passenger traffic moved over both tracks, there being the same quantity of passenger traffic on each—corresponding trains in opposite directions. The loads of coal moved on the eastbound track, on which there was a much heavier freight tonnage.

The result of studies of rail wear on this heavy tonnage track is indicated by certain charts I have produced, six in number. The purpose of the investigation was to determine whether a rail with a wider head on the flange side would add to rail life. The measurements taken indicated a heavy rail wear on the high tonnage line, and a short life of rail on that line, and that, after the rail had been in track a short time, the head wore back to a point above the web on the guage side. I found there that the time in which the tonnage wore the A. S. C. E. sections back to a point above the web varied with the degree of curve; for a three degree and 30 minute curve, the rail life was 32 months, and in this rail the wear was almost back

to the side of the web, next to the guage side.

On a compound curve, four degrees and 36 minutes, and six degree curve, on the eastbound track, a Manning rail was worn so that the throat of the flange came back to the side of the web, next to the guage, in 31 months; on the upper rail, it was worn back to a point above the inside of the web. At that point, the rail was elevated for safe passenger and freight train speeds,—a medium speed,—especially on the ruling grades.

On a compound curve, five degrees and 30 minutes, and an eight degree curve, the life of Manning rail was 31 months. On a Man-

ning rail, the flange side of the head is increased in width about \(^3\)\s of an inch, giving additional wear area on the guage side; on that rail, the wear was to over the inside of the web. On another Manning section, in a six degree and 30 minute curve, the rail life was 31 months, and the wear was a little further back. Those are all outside rails. None of those show low rail wear, as the Manning section was only put on the high side. There was very heavy rail wear on the low rail, especially on the grades; it was more flow; it wasn't necessary to take it out of track as quick as you would the high, on account of the flow, because you had more lateral strength in your rail. The cause of this wear was the freight traffic.

We found no curve on South Shore that had anything worn quite as excessively as on the B. & O. I found on their low grade line, between Ishpeming and Negaunee, some wear on the high side of a curve that approximated this wear. Generally speaking, I did not find the rail on curves on South Shore worn to the extent to which they are on the curves I have just described. The rail between Ishpeming and Negaunee that had large wear bore an old date, and I couldn't get reliable information on how long it had been there.

I examined some of the ore cars and loads, and their constructions; their wheel base is shorter than the ordinary hopper car I have been familiar with, cencentrating the load more on a 1470 bridge or a short stretch of track. It would probably produce a larger stress on track, on account of the concentrated load, when under speed, than the same weight of car with a longer wheel base, and on a bridge it would produce a greater stress than as

wheel base, and on a bridge it would produce a greater stress than as if the load were more distributed, depending on the span. From the wheel base and study of some of the spans, I found these ore cars would produce a greater stress on some of the bridges than some of the locomotives would. It is a fifty ton car; the cars themselves weigh 33,000 to 35,000 pounds. I think they have a locomotive weighing 190,000 pounds, but that has a longer base. I had the company's locomotive diagrams.

The higher center of gravity of a load, if it is on a curve, will tend to crowd the high rail, and on straight track an engine with a high center of gravity and any inequalities in track will tend to cause it to roll or rock, and the higher center of gravity will tend to push the guage of your track out of line; the hazard of derailments is also greater. I noticed two derailments when we were there, or their effects; there were a good many broken ties, in a pile, outside the track. I was told by a conductor it was a freight train derailment. Derailment is a source of considerable expense for track

structure at times.

The freight train derailment damages track very much more than a passenger train derailment. The effect is usually a great many more broken ties from your heavy freight cars derailed than from your passenger train. For the passenger train, usually, part of the engine equipment is derailed—the tender usually—and it scars the ties, but does not break them as much as a freight derailment. In

my experience, freight derailments are more frequent than passenger derailments.

I platted, on the charts, the rail wear on three South Shore curves.

(Blueprint marked Defts.' Ex. 83, Batchelder.)

1471 I did not mean the tie renewals would be half decay and half wear for the road, but for the district where those pictures (Defts.' Ex. 81 and 82) were taken. I made computations, or notes, fixing the amount of rail wear for freight trains at 62% on the whole line, and 32% passenger, taking this from counting ties in track in a district 3,000 feet long. I attribute the rail cutting to freight; your decay would be divided between freight and passenger on the percentage of the traffic of the two, but your wear is attributable to the freight trains, which cause a large percentage of the cutting of ties.

On this road, the cutting by freight trains would probably amount to 90%; that would be from observation of your heavy loads, and the relative effect of your heavy loads and your light passenger cars. don't think the locomotive cuts the ties as much as the car, on account of your equalizers on your engine; the shock is taken up by the equalizers, and you wouldn't get as much of a shock from track being out of surface from your engine, because it is better distributed over your equalizers. Your freight car has springs, but they are not nearly as effective as the equalizer springs in your engine, or in your passenger cars. In estimating 90% of the cutting due to freight, the volume of freight carried and the weight of your car would necessarily enter into it. In the line, Nestoria to Houghton, it is perceptible that the rail did not cut the ties nearly as much as where they carried the heavy freight traffic, between Nestoria and Marquette. Defts.' Ex. 83. Batchelder, charts measurements of a four degree curve east of Baraga, laid July, 1912, a five degree curve west of Bagdad, laid August, 1912, and a five degree curve one mile west of Negaunee, laid August, 1911. I chose those curves with reference to the degree of the curve, but not especially on account of the wear; I aimed to take them on a particular curve, to be a representative section; that is, not any defective rail, or anything of that character.

The fact that I could secure date of laying had to do with the 1472 particular section; it was all new 80 pound rail, laid within

the last two or three years.

Those sections and measurements don't indicate anything what you would call excess wear due to super-elevation. The effect of super-elevation is largely indicated on the low rail; if your elevation is too great for your speed, especially for your freight trains, in a very heavy traffic district, the metal flows on the low side of the rail, and the rail tends to cant out when you have too much elevation. Too much elevation tends to increase the wear on low rail; I never noticed any material difference in the high rail, but the tendency is to increase the weight on the low rail by super-elevating. On the rails shown on Defts.' Ex. 83, the greater amount of wear in each instance is on the upper rail.

Expressed in square inches of wear, the reduction is: On four degree curve east of Baraga, upper rail, .02 of square inch, and low rail, — of square inch; on five degree curve west of Bagdad, high rail, .09 of square inch, and low rail, .05 of square inch; on five degree curve west of Negaunee, high rail, .14 of square inch, and low rail, .13 of square inch. The total wearing area of the head of an 85 pound rail would be 3.49 square inches.

On the Cumberland Division of the B. & O., on the eastbound track, the high rail on a seven degree curve was worn 1.2 square inches in area, in 31 months; on a compound curve, five degrees and 30 minutes and six degrees, the reduction of the high rail was .255,

and of the low .18, of an inch, in 4.5 months.

On a compound, eight degree and seven degree and 30 minute curve, the reduction on the high rail was .22, and on the low, .257, of a square inch, in 4.5 months. On a compound curve, five degrees and 30 minutes and eight degrees, the reduction on the high side was 1.14 inches in 31 months. On a seven degree and 30 minute curve on Cumberland Division, the reduction on high side of

curve was 1.2 square inches in 31 months. On a two degree and 15 minute curve, the reduction on high rail was 1.495 square inches in 43.5 months. On a four degree curve, the reduction of the high rail was 1.595 square inches in 43.5 months. On a ten degree curve, the reduction on high rail was 1.71 square inches in 27 months.

In study of rail wear of B. & O., I spent a month in the field, taking sections of rail with a machine. I studied amount of elevation on South Shore, and came to the conclusion that they were elevated for

a speed of 35 to 40 miles an hour-a safe speed.

BATCHELDER.

Cross-examination.

By Mr. Eldredge:

I have never been directly concerned with operation. As division engineer, my duties included maintenance of the track and track structure.

The following quotation from pages 13 and 14 of an article of C. P. Howard in Bulletin 115 of American Railway Engineering and Maintenance of Way Association, published September, 1909, repre-

sents my judgment:

"Objections to curvature increase with the speed of trains. We assume this to be a fact; which is to say, it is justifiable to spend more money per daily train to take out one degree of central angle on a fast line between New York and Chicago, than on a slow-speed coal branch in the mountains. It is difficult to prove this by mathematics. The centrifugal force increases as the square of the speed. The super-elevation of rail designed to resist this force is a palliative

rather than a cure, and when elevated for high-speed trains, is charged with being a prolific cause of derailment for slow trains. Moreover, on track elevated for forty-five miles an hour, trains may run at fifty or sixty, and when elevated for sixty miles, a speed of seventy or eighty miles may sometimes be attained. For freight trains the conditions are different. Wellington says (page 268): 'It is fully as difficult and dangerous to run freight trains over sharp curves at twenty-five or thirty miles per hour as passenger trains at sixty miles per hour, owing to the difference in their mechanical condition.' We may, therefore, take about one-half the passenger

train maximum as a corresponding maximum for freight
trains, and it may be sufficiently accurate in many cases to
figure only on the speed of passenger trains on the assumption
that the speed of freights will be proportionately lower so as to give
about the same economy and safety in operating over any given

curve."

I have the data respecting relative rail wear on freight and passenger line on C. & N. W., between Chicago and Milwaukee. I took measurements on curves on the passenger line and on the freight

line.

A heavy freight train, if stopped on track, tends to pull the rail and cause it to creep in the direction of the movement of the train, the amount of creeping depending on the weight of your train and tonnage, and the creeping during a particular period depending upon the amount of tonnage carried over the track; the number of stops

would enter into it.

This creeping effect is not very noticeable under passenger traffic. On double track, where the loads are moved largely in one direction, the creeping of the rails is very much greater than in the opposite direction, where only the passenger trains and empties are moved; the most serious effect is to throw the track out of line; it causes the ties to slew together, and damages them, and pulls the spikes, and the rail and angle bars cut the ties; it permanently damages the rail, and the creeping of track tends to close up the expansion, and tucks or bends the rail at the joints, and gives it a permanent set.

It requires the track force to align the track, to drive back the fail, and open up the expansion, especially in hot weather, and the renewing of the rail becomes necessary; when your rail gets bent at the joints, the heavy traffic going over it tends to pound or batter the ends of the rail, and makes it necessary to renew it much sooner

than otherwise, causing tie replacement and labor.

In testifying, yesterday, to greater track damage from freight, I considered the character of freight equipment, and the shifting of loads. The freight equipment is not of as high character or design as your passenger equipment, and it is not maintained to as high a standard; rather, you could call it a crude construction, compared with the passenger train equipment, in that it only has four wheel trucks, while most of the passenger equipment has six wheel trucks, and the springs are more elaborate in your

passenger equipment, and your side bearings are kept oiled; usually, they have some patented side bearing on the coach roller bearing. It is not customary to oil the side bearings of freight cars, so, when they are in a certain position, supposing they are not traveling in the direct line of your tangent, the tendency is for them to hold that position until they are guided, and not oiling them, and not

being as true, they don't guide as easy.

The loading of freight equipment, of course, would shift, and it very often causes a car to be down on one side bearing, which will tend to hold the truck in a position not in the line of the direction it is taking—the direction of the rail—and, if it is not down on the side bearing, that is shifted enough so it holds the car down on its side bearing, on the bolster, it will tend to rock the car, keep the car rocking, and, of course, any impact that the track would get from the rocking of the car would cause more damage to the track.

I also had in mind imperfections in wheels and difference in wheel construction, and things of that character. A flat wheel on a freight car is not removed anywhere near the same time as on passenger equipment. You have a flat wheel on passenger equipment, and it is removed at once, and discipline is very severe for anyone who flattens a wheel on passenger equipment. The items I have speken of as causing greater freight wear would be appreciable,

as a whole; they represent considerable items.

1476 I went on to the L. S. & I. railroad and made investigation to determine whether that was of a higher or lower degree of maintenance than South Shore. I found their standard of track

construction was better than that of the South Shore.

I took photographs to illustrate this. In addition to maintaining as good surface as the South Shore, they have tie plates on curves, saving the tie from being damaged by rail cutting, and assisting in maintaining the guage. That gives two or three spikes to help keep the rail in place or in gauge; on some of their curves they had tie rods. The South Shore, without tie plates, would have only one spike outside the curve rail, to take the thrust, while, with the tie plate, the outside and inside spike both help maintain the guage and take the outward thrust. (This has a bearing, because the L. S. & I. is an exclusive freight road, with the exception of a very limited passenger service, and is better maintained than South Shore.) The joints on L. S. & I. are re-inforced, and more expensively constructed. They vary from the ordinary angle bar, in that it is a truss effect; the joint has wider flange, and this flange is so rolled that it forms a truss under the joint, and gives better rail support.

1477

On August 12, 1914.

LEVI P. ATWOOD, a witness called by the defendants.

Direct examination.

By Mr. Wykes:

I live at Madison, Wis. I am on the engineering staff of the Railroad Commission of Wisconsin, and have been since March 1, 1914. I have been more or less actively connected with railroad work since

the beginning of 1896.

I was in the Maintenance of Way department, in the beginning of the year 1896, on the Peoria & Pekin Union Railroad. summer of 1886, I went to the Rio Grande Sierra Madre & Pacific in Mexico, as Assistant Engineer, and in 1987 I was made Engineer of Maintenance of Way of the same road, and I was with them practically all the time, in that capacity, until 1903. I was then made Superintendent of the road, and, in that capacity, had charge of maintenance of way department; while in that capacity, I also served as Chief Engineer of the Sierra Madre extension, in Mexico; that was intended to be a portion of the road of which I was superintendent, but was a separate organization. In March, 1905, I became Engineer of Maintenance of Way of the Chicago, Peoria & St. Louis Railway; I was with them for a few months, and was transferred to the Litchfield & Madison Railway, as Superintendent. I staved with that road until the spring or summer of 1906, and I became Assistant Engineer on the Southern Pacific lines of Mexico, in charge of operation of lines that were constructed but had not yet been turned over to the operating department. I there fulfilled the duties of Superintendent and General Storekeeper, and had charge of the transportation, maintenance of way and equipment, work pertaining to the lines under operation but still in the hands of the chief engineer.

I left the service of the Southern Pacific in 1906, and engaged in private practice, in California, with headquarters at El Paso, Texas. During that time, I performed various classes of engineering work,

covering some railroad location and construction and a great deal of railroad reconnais-ance work in connection with general engineering matters. Those were just railroad matters that came to me in connection with my private practice; but, during that time, I did considerable reconnais-ance and railroad construction.

None of the roads on which I did reconnais-ance or location work had been built, with the exception of one road that I started construction of and which was stopped because of the Mexican revolution, after I had it partially completed.

I am a graduate of the High School of Rockford, Illinois, and of the University of Illinois, in civil engineering; also a business

course, at Rockford.

I accompanied Mr. Batchelder on trip over the South Shore, the itinerary of which was correctly stated by him. My purpose was to observe the character of the roadbed, with reference to condition, maintenance, and the traffic. I investigated it with reference to the character and degree of its maintenance, endeavoring to keep in mind the roadbed, ties and rails, to the greatest extent possible.

We spent five days, from August 1st to 6th, and I walked over 25 miles of the track, and observed the elevation on a considerable number of curves, and I observed that, in most cases, the wear predominated on the outer rail, where there was very much wear in evidence. I noted the curve elevations were not always uniform,

nor consistent.

I rode on two freight trains, and took the speeds. The maximum freight train speed I found was 34 miles. It was our intention to catch maximum speeds, and we took none under 25 miles an hour of freight trains. We took 18 different instances, as I recall, and none of them happened to fall below 25 miles an hour; on

two different freight trains, the maximum was 34 miles. We took the time a considerable number of timees between various mile posts on different passenger trains, to ascertain the speeds, and found the actual running time between mile posts to be 53 miles, maximum, and a majority of the miles we took fell between 40 and 45 miles. We took 68 different speeds, and the majority fell between 40 and 45 miles, when we thought they were running probably at their maximum speed, or at places where you might expect maximum speed, the purpose being to catch actual maximums.

In my engineering work, I have had charge of maintenance. On the Litchfield & Madison Railroad, of which I was Superintendent, 40 odd miles out of 50 was engaged in exclusive freight service.

My investigation of South Shore was sufficient to permit me to form an opinion as to whether the road was maintained in a higher degree of efficiency than it should be if the road were engaged in freight service alone, and I did form an opinion on that question. In my judgment, the South Shore is not maintained to a higher degree of perfection or efficiency than it should be if its business were limited

to freight

My investigation was directed to that particular question. I think it is maintained in a condition that is entirely safe for passenger business. I saw some things that, if I was in charge, I would like to improve; but, from the character of maintenance and the information I had, I considered the road in very good shape, as far as maintenance is concerned. In my judgment and experience, I would want the roadbed kept in just as good or better condition, as to its strength, for freight traffic than for passenger traffic, so far as roadbed and track is concerned. That includes the track and road structure, and I am referring to strength, not to appearance.

A poor degree of maintenance adds very materially to the cost of operation; as the degree of maintenance drops off, the cost of operation, with reference to those items that are affected by the perfection or imperfection of the track, increases in a greater ratio.

If the maintenance work is neglected, and the joints become low, bolts loose in the angle bars, and track and roadbed not properly drained, the ties commence to churn, and, if they are not taken care of very quickly, they get in a much worse shape very rapidly, and it takes more force and costs more to get them back in shape than it would if it was kept up. The old adage "a stitch in time saves nine" is applicable to track maintenance. It works not only with reference to the track expense, but also as a deleterious effect upon the repair and maintenance of equipment.

It also has an effect upon the capacity of loads, if it gets to a bad enough degree. It has an effect upon the cost of coal, and will affect all items with reference to getting the trains over the line These costs would increase as the degree of maintenance went down.

The South Shore tie renewals are due to decay and mechanical wear. The cause varies in different parts of the road. The majority of ties I examined, Nestoria to Houghton, were taken out because of natural decay, and at different places along the main line, particularly between Marquette and Nestoria, the majority of ties came out because of mechanical wear, rather than decay. I noticed more cut ties in track, Marquette to Nestoria, and east of Marquette, and west of Nestoria, than between Nestoria and Houghton. When I say cut ties, I mean cut to an inch or more. I noticed most cutting between Marquette and Nestoria.

In the curves I observed, I noticed very little wear on the inner rail; the wear was mostly confined to the outer rail. I looked for the

wear on both rails.

that is correct for speed between 35 and 40 miles an hour, though the elevation is not consistent, and varies at different curves of the same degree, and in the elevation of the same curve. I arrived at their intention from the examination of the elevation and answers of different track men as to elevations they were intending or instructed to carry. I examined curves wherever I had an opportunity, examining all the curves where I walked over the track. I took the elevation on, and made a record for, 13 curves.

I have four different curves of 4 degree, with elevations of one inch, 1% inches, 1½ inches, 1¼ inches, 1¾ inches, and 1½ inches, all on four degree curves. On a 2½ degree curve is an elevation of 15% and 2½ inches, at different points. On a 3 degree curve, at three different points, were elevations of 25% and 2% inches. Thus, elevations of the same curve would be taken at different points on the

curve.

That would not account for the difference. The super-elevation, measured with these different results, shows that they are not consistently maintained in elevation, nor is the same degree of elevation carried on all curves of the same degree. Most of these curves were measured at random, as we came to them in the course of our walk; wherever rail section was taken for rail wear, we took the elevation at that point, also, but others were simply at random on the curve we were walking over. We didn't pick out a curve and go to it with the

specific object of measuring its elevation, and didn't measure some and then exclude the measurements. I was also careful to take the

My judgment is that, on South Shore, the freight train mile would cost more, with reference to those items pertaining to roadbed, rail, ties, ballast, sub-grade and bridges, than the passenger train

1482 I assisted Mr. Batchelder in taking the measurements of rail sections shown on Defts.' Ex. 83, Batchelder, and that ex-

hibit correctly shows the conditions as we found them.

There was no pre-meditation with reference to where we walked. For instance, at Soo Jct., Kenton and Trout Creek, we walked because the train service gave us the time; we dropped off the train at Baraga, to walk to L'Anse, and that is the only place that we anticipated where we were going to walk. When we were off the trains, between trains at different points, we utilized the time walking and observing the track, but that is not included in the list, because it wasn't distance

enough to mention.

mile.

I noted all the track labor working as I passed over the line, making a memorandum of the track forces. I took the limits of the sections from the profiles, and tabulated the data, to form some conclusion as to the maintenance forces and their distribution. There is more labor in the portion of the track, Marquette to Winthrop Jct. (north line), than anywhere else on the line that I saw; the next in order is Marquette to Eagle Mills (south line); the next, Nestoria to Houghton; the next, Winthrop Jct. to Nestoria; the next, Soo Jct. to Marquette, the next, St. Ignace to Soo Jct.; and the least, Soo to Soo Jct. Marquette to Winthrop Jct., there was an average of .79 of a mile of main track per man I saw working, and Marquette to Eagle Mills, .86 of a mile per track man. That does not include the extra gangs I saw working, but only the regular maintenance forces.

I was firmly convinced in my own mind, after making a trip over the road, that renewals and betterments work had been rather heavy in recent years, and that was confirmed, in my opinion, by statistics that were made available for my observation after I returned, with

reference to tie renewals over a considerable period of years
1483 past, and also with reference to the charges against the maintenance of way accounts for a very considerable number of years
past, and they tended to confirm the opinion that I had formed by
going over the road, that renewals and betterment work had been
12ther extensive in recent years. Of course, the rail showed for itself.

The Master: Then your judgment would be that, previous to recent years that you refer to, it was not kept up as it ought to be?

A. I couldn't say as to that,

The Master: That would follow, wouldn't it, from your testimony?

A. Just a deduction that one might make; I never saw the road in years past.

The Master: Wouldn't that follow from your testimony that you

have given heretofore?

A. Not entirely. This might be the condition: The road ten years ago might have been in just as good a degree of maintenance as it is today, but, through tightening of money, or desire of the management, or for some purpose, the expenses for maintenance of way might have been curtailed, and, by the way, that is the first department that always gets it, whenever there is anything shut off, the maintenance of way department is generally the first one that has to reduce expenses, and had they started in then to curtail their maintenance of way expenses, without any intention of letting the road get eway from them, nevertheless, it might have deteriorated more than they anticipated or had thought that it would, and three or four, or possibly five, years of that kind of maintenance would get it in such shape that it would be necessary to make unusual expenditures to get it back into the shape that it might have been, say, ten years ago, without any intention to let it get down below normal condition. From the road itself, except the rail, there was nothing to indicate when the improvements were made.

56 S 4 Min. 41 S

Refers to D. S. & A. Ry.

Actual Running Time Taken.

Train No. 1-St. Ignace to Soo Junction, August 1st.

								at 12:07 P.			33 33	13 8	23 25 25		13 8	2 Min. 00 S	
	Arr. 59 Min. late						10 Min. 45 sec. Av. Card speed = 22.4	Leaving 1 hr. 5 min. late at 12:07 P.	Arr. 1:47 P.		Av. card speed 29.1 ml.			Stopped at Brimley			
				sec.			Sec.										
				13			. 45										
Station stops.	25 sec.	43		9 Min. 25 sec.	12 sec.	1	10 Min										
Curves.	No	No		Yes	No				No	Yes	No	No	Yes	No		No	
Grade.	æ.	9	+ :2	2:	10.				+ light	+	light	-0.5	-1.0	-0.7		light	
Average Station running speed, Grade, Curves, stops.	:																
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	Train 43
8/2/14	

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No

485

Refers to D. S. & A. Ry.

Actual Running Time Taken.

Train No. 1, of 8/2/14, Continued.

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Actual Running Time.

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Train No. 4-Marquette to Ishpeming:

8/3/14

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8/4/14	246	242	1	75	388	• • • • • • • • • • • • • • • • • • • •		Yes	M.	M. P. 250.1 to 200.9	to 200	6.0					
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191 190 190	M. P.	Mln.	Sec.	M. P. H.	Grade.	Curves.	stops.			
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189 D 10	198	-	10	36	No	No	2 M.	15 8.		
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D 20	D 21	1	12	#	Light	Yes	Total 13 M.	8		
0 88	D 24	1	35	33	No	Yes			Average card speed is 23.5 mt. per hr.	5 ml. per hr.
D 26	122	1	43	88	-1.5	Yes				900
D 27	D 28	1	21	7	10.4				26.6 av. actual running time Nos. 105 and 105.	ne Nos. 105 and 105.
Train	No. 33	No. 33—L'Anse		to Houghton.	Lv. 4:10	P. M.	L'Anse. Arr. 4:22 Baraga:	4:22 Be	ıraga :	
8/5/14 D 19	D 20	1	17	34	Light	Yes				
	D 21	1	49	33	Light	Yes		Baraga		
120	D 26	01	8	30	1.0-			Кеwеепаw	W	
0.20	D 30	1	22	31	Yes	Yes	I.v. 5.44	:		
D 31	D 32	01	S	56		Yes		Chassell		
D 32	D 33	01	18	22	:	No		:		
D 33	D 34	01	89	ন	Light		Ar. 7.15 a	at D 46		
D34	D 35	21	80	Si	Light					
D 37	D 38	21	3	8	No	No	Light train tonnage	tonnage	•	
Average	running	Average running speed is 25 M.	25 M	I. P. H.		-				Territories and the second sec

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									2.50 P.			
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6 to A	Run practically on time		Stops 1 Min. 38 Sec.								1	Total 11
D 48.	Run		Sta.									Total
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ain	39	35	31	ন	16	14		9	+	ಣ		
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8/6/14												

Above stops between Houghton and Nestoria only. D refers to Houghton, Nestoria,

Average running speed 27 M. P. H. D. card speed is 24.7 mi. per hr.

Branch.

Summary.

Pass.-Fr.

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	94	44	44	30	or	m	ore.					 	 	 	 						 	
	64	44	66	25	to																	. 1
	94		0.0																			, nor

1489 Train 55 is a freight. With reference to this train, I noted the actual running time between mile posts in nine instances. I noted all the stops between stations, and from the total time between stations I deducted the actual time the train was at a standstill, and divided that by the miles, thus arriving at the actual average running time, including the running time of getting under way and making the stops, but eliminating the time the train was standing still.

Train 33, a freight, treated in the same manner, showed actual average running speed of 25 miles an hour, and between mile posts D 19 and D 20, on a four degree curve, level track, a speed of 30

miles an hour was noted.

In this tabulation, the first column gives the date, the next two give the mile posts, the next two give the minutes and seconds of actual running time, the next gives the miles per hour, the next gives the average running speed, the next gives the grades, the next, whether on a curve, and the last column is remarks, including the intermediate stops, noted with a stop watch. The average card speed noted is the difference between the leaving and arriving time, as shown on the time card, divided by the distance between stations. The average running speed is the actual time the train consumed while under motion. All trains but 55 and 33 were passenger.

In taking the two freight trains, there was no design except to facilitate the time on the road, and to expedite covering the road in

the shortest time possible.

It takes a little longer time to start a freight than a passenger train, depending on the tonnage and engine, the grades, and the place on the track at which the train starts and stops; but, generally, it takes more time to get a freight train under headway and slow it

down than it does a passenger train. On South Shore, there is no great amount of extra time used in slowing down freight trains; but, generally speaking, it does take more time, as

the brakes are not as efficient on a freight train for quick stops, and the freight engines are not designed to accelerate their speeds as quickly as are the passenger engines.

1491

On August 12, 1914.

G. F. Bristol, a witness called for defendants.

Direct examination.

By Mr. Wykes:

I live in Grand Rapids, and am, and have for eight years been, engaged in contracting for concrete foundations, principally railroad bridge foundations. Previous to that, was in the employ of the Pere Marquette for 17 years, in the engineering department, in various capacities, on location, construction and maintenance of way, four years being spent as Assistant Engineer in charge of maintenance of buildings and bridges. My territory covered the Grand Rapids district, of about one thousand miles of main line.

I am at present assisting Professors Cooley and Riggs in making valuation of the Pere Marquette, having been on that work two

weeks, and being employed by Mr. Riggs.

In my work for Pere Marquette, I became familiar with the character and degree of maintenance necessary for different services. I went over the South Shore with Messrs. Atwood and Batchelder. The description of the trip was substantially as stated by them.

It was my purpose to observe, and I did observe, the same things entering into the track structure as Mr. Batchelder testified to observing. I formed an opinion upon whether the South Shore bridges would be of any less expensive type or maintained in any less degree than at present if the service was limited to freight. My opinion is that the bridges are, for safe and efficient freight traffic, none too well maintained, and the types none too good.

Taking the track structure and roadbed of the South Shore, which I examined, as a whole, my investigation was sufficient to permit me to form an opinion of whether the degree of maintenance was beyond what would be required if the road had freight service only.

I formed an opinion upon that question. It was that, for 1492 efficient and economical freight operation, I would not advise

a lower degree of maintenance.

Our observation of ties removed from the track seemed to point very strongly to the predominance of wear as determining the removal of ties from track. We noticed ties in track for rail cutting, and the rail cutting was quite general over the line. In walking over the track, we observed all the curves we passed over, for degree of elevation and amount of wear. I formed the opinion that it took more time to get freight trains under motion, and make station stops, than passenger.

The freight trains on which we rode did not take sidings at any time during their trip. When the engine was doing stational work,

the train stood on the main track. The longest time I have in mind that the freight train kept the main line while the locomotive was doing stational work was an hour and forty-two minutes, which was at Trout Creek. During that time, the locomotive was switching in the yard, and standing with the peddler cars unloading freight. The caboose and several cars ahead stood on the main line.

On our trip, L'Anse to Houghton, on the local, the train kept the main track clear through to the Houghton yard, and the longest stop we made was at Chassell, where the engine switched in the lumber yard tracks and did work at the freight station, while the caboose and rear end of the train kept the main track. While making stops at stations, the locomotive was working part of the time and standing still part. On entering a station, they usually stop the peddler car in front of the freight house, at which local freight was loaded and unloaded. If any switching was to be done, part of the erew would cut the engine off and work on the siding, switching out and placing cars, the balance being engaged in handling local

1493 freight.

(Agreed that, of the expenses of Mackinaw Transportation Co., June 1, 1912, to April 20, 1913, Soo Line paid \$12,365.62 and D. S. S. & A. \$18,310.80, of a total net expense of \$30,676.42. In addition, D. S. S. & A. paid \$50,911.46 on the new boat and contributions to boat replacement, making a total for D. S. S. & A. of \$69,222.26.)

(Admitted by plaintiff that in minority report at 1914 session of American Railway Engineering Association, C. P. Howard being one

of the signers, the statement was made:)

"Last year the attempt was made to divide the expense of maintenance between passenger and freight, using a multiple two for passenger tons. Because this multiple was rejected by the association as not proven does not minimize the importance of securing information on the subject."

1494 Testimony Before the Court (on the Trial).

1495 George L. Fowler, a witness for plaintiff, produced before the Court on Nov. 20, 1917.

Direct examination.

By Mr. Eldredge:

I live in New York City; am 62 years old. I am a consulting engineer, without the degree of Mechanical Engineer. I am a graduate of Amherst, have taken the course of mechanical engineering in Columbia University, and have been in mechanical work all my life.

On leaving college, I entered a machine shop engaged in manufacturing cars and running gear, and learned the machinists' trade. I then went to the Industrial Works of Bay City Mich., in charge of their drawing department, maunfacturing excavators, pile drivers,

and similar machinery. Then I was assistant to Master Mechanic on the old Flint & Pere Marquette Railroad, at Saginaw, Mich.; afterwards, Superintendent of the A. T. Bartlett Co. of Saginaw; and since then I have been Superintendent of the Peckham Truck Mfg. Co. of Kingston, N. Y., and since I have been engaged in mechanical work, research work mostly, in regard to cars, locomotives and railroad work generally.

I am able to value locomotive engines and determine their condition: I was employed at plaintiff for that purpose, going to Mar-

quette, last September, 1917.

I made a personal inspection of all the engines that ran into Marquette, and the switching engines at Ishpeming and Negaunee, making a careful external examination of all such parts of those engines as were easily accessible without having the engines dismantled. I think I saw and examined 45 engines out of a total of 78. I went to the records of the company and examined in detail the repair costs for labor and material of every engine on the road, and.

inasmuch as repairs for the engines which I did not see were right on a par with those which I saw, I assumed that their physical condition would be at least as good as those which I had the privilege of examining. I had an opportunity to examine the interior of boilers that were in the shops for general repairs, and went over the scrap heap, and looked up the matter of the tubes which had been removed. I also saw a number of the engines which had been washed out, and the general condition of the water at the same time. The 45 engines which I examined included every type of engine now in use on this road. After making this examination and obtaining this data, I made a valuation of every locomotive,

which valuation is shown on plaintiff's Ex. 211.

I made a similar valuation of the passenger train cars, which is shown on plaintiff's Ex. 212. I first made an inspection of such passenger train cars as were accessible at Marquette, and also went out to Michigamme to make an inspection of the cars which were standon the track there, and which did not come into Marquette. included every type of passenger train car that was in use upon the I inspected those cars as they came through on the through trains, sometimes making several visits to the same train, in order to have time to take the whole train. And also the cars that were standing in the passenger yard at Marquette. I made the inspection in essentially the same way that I did the locomotives. looked over the trucks, the under framing of the car, condition of the interior, condition of the floor, condition of the platforms, couplers, air brakes, and everything that was visible to an ordinary inspection, and then wrote in my books the memorandum of my opinion of the physical condition of the cars.

1 assumed the condition value of the cars for 1913 to be the same as that set down by Mr. Riggs in 1913, and then, in order to obtain the reproduction value of the cars, I found that the Barney & Smith Car Co. of Dayton, Ohio, had built a large number of cars for the company, and I went to them for estimates of the cost of reproduction of those cars for the years 1914,

1915, 1916 and 1917. They made such an estimate, and gave me access to copies which I have, original copies of all of the figures upon which that estimate was based. The result was that the estimate which they furnished and which I have checked off from their original figures agrees exactly with the Riggs valuation for 1913. I then took their figures, or took these figures for 1914, 1915, 1916 and

1917, and wrote them in after these figures.

Then I took the percentage of increase for each class of rolling For example, you take a first class coach and take the percentage of increase as obtained from the Barney & Smith Co. for the first class coach which they made the figures on for 1914. about six per cent, I think, in advance, something of that sort. for 1915 I took their figure in advance, and for 1916 and 1917. Then I applied that percentage of change of value to all of the other first class coaches on that road for which I did not obtain a direct estimate, applied that percentage of change of value to the Riggs valuation of 1913, and in that way I wrote in reproduction cost of each individual car on the road for the four following years. in order to obtain the current value, present value, as it is marked on the schedule, I took the condition valuation of Riggs for 1913 and applied the Master Car Builders' rules of depreciation for the depreciation of passenger car rolling stock. That rule is that the depreciation shall be straight three per cent per annum down to 50% beyond which there shall be no further depreciation, so that when I found a car on the Riggs valuation where he had given it a 50% value in 1913, I wrote "No further depreciation" on

that car, but for cars where he had a higher value, 70%, 80% or 90% or whatever it might be, on those cars I deducted three per cent per annum for the four years, making a total of 12% for the valuation of 1917, and in that way obtained the value—the current value—of each car in the passenger train equip-

ment of the road.

I examined 35 out of 72 cars, and found no car in less than 50% condition, so far as my own examination of its physical condition was concerned.

I also made a valuation of freight train cars, shown on plaintiff's Ex. 213, and shop machinery and tools, shown on plaintiff's Ex. 214.

For freight train cars in service in 1913, I assumed the Riggs valuation of 1913 as a basis, obtained manufacturers' prices for 1914, 1915, 1916 and 1917, and increased the Riggs cost of reproduction values accordingly. I used the Riggs condition valuation of 1913 as a basis to determine condition, and successively for each year thereafter subtracted for further depreciation according to the Master Car Builders' rule, with a minimum of 20%.

For shop machinery, I obtained scales of variance in prices for the years 1914, 1915, 1916 and 1917, and increased Riggs' 1913 values 40% accordingly. I then, to ascertain present value, applied the Riggs percentages of depreciation, no additional depreciation be-

ing allowed.

As the result of my inspection, I made a memorandum of what I considered to be the physical condition of the engines; also of what I considered their value condition, on the basis

of the general character of the engines with reference to age and possible obsolescence. I mean by obsolescence an engine that is old and not up to the present design, so that if the railroad company were to purchase new rolling stock, they would not buy an engine of that character. Obsolescence is the only necessary depreciation, except a slight depreciation due to wear, but an engine properly maintained can be held up to its original working or physical condition through an indefinite life.

I then assumed the condition value of the engines as given by Riggs in 1913. Then, learning that the D. S. S. & A. allowed 2.5% per year depreciation on engines, and that appearing to me to be a reasonable amount, I deducted 2.5% per year from Riggs' condition value, allowing 2.5% for 1914, 5% for 1915, 7.5% for 1916 and 10% for 1917. The prices I used for engines were the average for

the fiscal years.

I did not examine the locomotives for the specific purpose of confirming Riggs' values and figures.

FOWLER.

Cross-examination.

By Mr. Wykes:

I was limited by the condition value fixed by Riggs in 1913, and the depreciation allowed from that took care of the value of the engines automatically, regardless of my opinion as to its physical condition. The only thing I wanted to be sure of was that the physical conditions as I found them were as great or higher than the value conditions which would automatically come in with the allowance of the depreciation which I was giving to the engines. The 25% and high depreciation which I allowed was to take into consideration the obsolescence and decreasing physical condition.

I started with Riggs' fixed percentage, assuming that that percentage represented the condition of the locomotive, taking into account obsolescence at the time. I then went through the mathematical computation of cutting it down 2.5% per year. I assumed that Riggs allowed for obsolescence. If he did not, I did not understand the basis of his figures which I have taken.

My prices I obtained from the American Locomotive Co., telling them the purpose for which I was getting the figures. I did not

attempt to get a price for the purpose of purchasing.

I paid no attention, whatever, to the cost prices of the engines in making my estimates. In making my valuation of locomotives, I was not interested in knowing what second-hand locomotives sold by the company were actually sold for. It was immaterial, as far as my work was concerned.

My values for locomotives for 1914-1917 were entirely independent of those of Mr. Riggs for 1913, except that I used and carried through the Riggs percentage of condition with the annual reduction of 2.5%. I did that because I believed Riggs had allowed for obsolescence in his condition value, and I was willing to accept that because of obso-

lescence, but, if Riggs did not allow obsolescence, then I allowed down

to his percentage plus the depreciation, in addition to that.

I did not investigate to ascertain the cost to the company of the new locomotives purchased in 1913. I paid no attention to the 1913 valuations. The only thing I did do there was to use their condition value in 1913 as the basis for the additional depreciation. The 15 locomotives, after four years of use, are valued by me in 1917 at 30% more than they cost in 1913.

1497 Nelson Caderette, a witness for plaintiff produced before the Court, Nov. 20, 1917.

Direct examination.

By Mr. Tracy:

I am 46 years old, reside at Duluth, and am assistant engineer of plaintiff, having been in its employ continuously for 26 years as draughtsman, engineer of maintenance and construction on the road and in the office. In 1911 and 1913 I assisted Mr. Riggs in making and revising his inventories and valuation of plaintiff's railroad, and in 1916 started and am still working on the inventory of the road for valuation purposes for the I. C. C. In the latter I had charge of making maps and profiles and seeing that field parties took the proper quantities of materials. In the last 15 years have been over the line 2 or 3 times a month; it is a part of my duty to look for defects in

the track and other things needing reporting.

I have prepared an exhibit (Pltf.'s Ex. 201) bringing the Master's valuation of June 30, 1913, down to date. My work continuously since August 1917, has consisted in making an inspection of the several structures and obtaining from records lists of property added and retired. I attempted to ascertain the condition as to depreciation. The first sheet of Ex. 201, shows the property divided into 43 schedules, the columns being: first column, list of schedules; second column, Master's valuation as of June 30, 1913, subdivided as to services. Third column, value of property retired since June 30, 1913, at the Master's values, the data being obtained from our records; fourth column, value of property added since June 30, either at cost or at average prices for 1917. The prices were obtained either from records of purchases or by consultation with engineers Young

1498 of L. S. & I., Loweth of C. M. & St. P. and Lewis of South Shore, and my personal knowledge of unit prices; fifth column indicates the Master's quantities less retirements, computing the remaining quantities at 1917 unit prices; column sixth is the total of columns four and five and is the total value of the different schedules

for June 30, 1917.

Schedule 1, Right of Way and Station Grounds, includes all the land used for railroad purposes, and figures on page 1, of plaintiff's Ex. 201, shows additions and retirements correctly. Schedule 3, grading, includes clearing, grubbing, grading, excavation, cor lursy, retaining walls and riprap.

The retirements and additions are correctly shown.

The unit prices applied to items include I under grading, appear on Sheet 12 of plaintiff's Ex. 201, and are there compared with those found by the Master, the price being 40¢ for grading, including overhaul and shrinkage. The prices used are made up of the average cost of labor and material for 1917 applied as of June 30. I made a study of the correctness of these unit prices and in my opinion they are reasonable and somewhat too low.

Actual prices paid by us for contract work on connecting track between the Negaunee and Palmer track to Winthrop track of the C. & N. W. in 1917, were clearing \$60 and grubbing \$264 per acre, grading 50¢ for earth, 75¢ for loose rock and \$2.50 for solid rock per cubic yard. I did not use these prices as I thought this a small hurry-up job, and I did not think them a good average, though the work

could not have been done much cheaper.

I depreciated no items of schedule 3 and except retaining walls

which were depreciated upon my personal inspection.

Schedule 5, Bridges, Trestles and Culverts, consists of steel, iron, concrete and wood structures. Steel bridges are valued by applying a price per pound in place; the wooden bridges by a unit price 1499 per thousand feet of timber in place. Page 1, of Pltf.'s Ex.

201, properly shows the bridges retired and added since 1913. In instances the additions are put in at actual cost (four instances) and in others on new unit prices. The unit prices used on bridges appear on sheet 12 of Pltf.'s Ex. 201. The \$49 per thousand u.ed for wooden bridges, consists of timber f. o. b. Superior per M. \$32: freight 64¢, loading and unloading \$1.50; labor, framing and erecting \$15, total \$49.14 per thousand. The Master used the same elements but I increased some of the base prices due to the increased cost of labor and materials. I simply attempted to bring appraisal values of 1913 down to date. In putting a new bridge in place of an old one, the charge to additions and betterments is the difference between the cost of the new and the value of the old bridge in use and in I merely took the bridges retired off the Master's list at his valuation and added the new bridges at the new values. I think the unit prices for bridges are fair and reasonable. The percentage of condition of schedule 3 was found by inspection and a study of the repairs and as the bridges have had four years' use the general effect is lower than the Master's percentage of condition.

Schedule 6, Ties: these are inventoried at so many per mile and the percentages to the total determined by inspection, as cedar 18%, hemlock 59%, tamarack 23%. That is a fair average of our ties. Additions and retirements were made as described. Unit prices for 1917 were taken from the Company's records and I used an average of 35.8¢, made up of cedar 41.72¢, hemlock 34.63¢, tamarack 34.35¢; the 35.8¢ was a weighted average. To this I added 9¢ per tie for hauling, loading and unloading but nothing for inspection. The

Master added 6¢; my 50% increase is caused by the increased cost of labor, train equipment, coal, etc., I did not change the percentage of condition from the Master's 55%.

To the best of my knowledge ties were in practically the same condition in 1917 as in 1913. From June 30, 1913, to June 30, 1917, 54% of the Master's quantity of t.es, or 725,976 new ties were put in on main line in Michigan. We replace ties when they get close to 50%. They could not be used longer as they decay and spikes won't hold. A tie is worth nothing after taken out. The normal condition would average 50%. I think the Master's 55% would be low enough and on account of the 54% of new ties put in; I left the condition as he found it. Eight years is about the life of such ties as are used on D. S. S. & A. Some will not last near as long and cedar lasts longer. An average of 6 years is about the life of a hemlock or tamarack tie. The average life of all the ties, including cedar, on the D. S. S. & A. is not over eight years.

Schedule 7, Rail, taking the Master's quantities, I deducted the retirements, applied unit prices and added the additions. The unit price was based on rail at Chicago, \$38 plus the tariff rate to Marquette \$2.25, transportation on our line 60¢, unloading and handling 30¢, inspection 10¢, total \$41.25 per ton, which was applied to all tonnage of the line. I obtained the base price from the Purchasing Department. The rail is depreciated down to scrap value. I fixed \$30 per ton for scrap which is a fair average or low. We sold some as high as \$42.50 a ton in 1917. To arrive at percent of condition I used the Master's condition percentage as a basis and de-

ducted 2.5% a year. I think that a fair average.

Schedule 8, Track Fastenings. We applied a certain number per mile of track to ascertain quantity. Where track was retired 1501 I retired the fastenings and where new rail was put in I put in new fastenings. The unit prices, stated on sheet 12 of Plt.'s Ex. 201, were obtained from records of bridges, consultations with other engineers and my own knowledge. I depreciated the same as rail allowing scrap value to abgle bars only. Schedule 9, Frogs, Switches and Crossings, was handled and depreciated the same as track fastenings and I thought the 1917 price fair and reasonable.

Schedule 10, Ballast. The quantities are the same as the Master's except on branches retired and added. About 95 miles of the track has been reballasted but to be conservative I assumed that would make good depreciation and did not add it. The Master figured 9 inches for gravel and 6 inches for cinder ballast under the tie. The I. C. C. in 1916, made test pits, about one every mile, to ascertain the amount of ballast. In soft places, east of Marquette, through Seney Swamp, they found 18 to 24 inches of St. Ignace gravel below top of tie, on the average. I applied prices of 80 cents for gravel and stamp sand and 45 cents for sand and cinders per yard.

Schedule 11, Track Laying and Surfacing. This is a labor item including laying ties and rails and surfacing the ballast. I took the Master's mileage and increased his price 50%—\$600 to \$900 per

mile.

Schedule 12, Fencing. I used the Master's quantities, added additional fence, deducted 10% from Master's condition and applied new unit price, based on cost in fall of 1916. In my judgment the

prices used represent a good average. The 10% I think sufficient de-

preciation.

Schedule 13, Crossings, Cattle Guards and Signs. I treated this about the same as fencing and increased the Master's price 25% in some and 50% or 60% in other cases, based on my experience, on purchases and consultation with other engi-

neers, of the cost of labor and material.

Schedule 14, Interlocking and Signal Apparatus. The additions

and retirements in Pltf.'s Ex. 201 are correct.

Schedule 15, Telegraph and Telephone. I treated entirely as a labor item as the telegraph company owns all material and plaintiff constructed. I increased the Master's price 50% and reduced his per cent condition from 70% to 65%, using my judgment. We maintain the telegraph line and have spent sufficient to maintain it in

practically the same condition as in 1913.

Schedule 16, Side Track. The price includes the grading and all track material in place. They include all tracks, except main line and traffic spurs. I used the Master's quantities for side track, deducted retirements and added additions. I applied the same unit price as applied to the separate elements entering into side tracks and reached a price of \$6,850 per mile. The same per cent of condition was applied as on similar material in other track but ties were put lower, because of culls being used.

Schedule 17, Stations, Buildings and Fixtures. From the Master's inventory I deducted retirements and used the balance. There has

been increase in the cost of building materials since 1913.

Schedule 19, Shops, Engine Houses and Turntables. This—handled the same as Station Buildings by applying additions and retirements to Master's valuation but making no recomputation of new unit prices. The condition was as good in 1917 as 1913.

Schedule 20, Shop Machinery and Tools. I used Mr. Fowler's figures having furnished him with the additions. The correct amount is \$150,599 including additions of \$4,903. This corrects an error in Mr. Fowler's figures due to an omission.

Schedule 21, Roadway and Construction Tools. I took the Master's quantities and conditions to reach 1917. They are being kept on an equally good standard as in 1913. I increased the values 60% due to increase in costs. Track shovels and tool steel have gone up 100% to 400%.

Schedule 22, Water Stations. Pltf.'s Ex. 201 correctly shows additions and retirements. Upon prices obtained by purchases of material and consultation with engineers I used for tank complete without pumping station \$2,167.00. We constructed one in 1916 at a

cost of \$2,502.

Schedule 23, Fuel Stations. I valued these the same as for bridges, using new unit price, which I think a fair average. The additions and retirements are correct.

Schedule 26, Docks and Wharves. The figures were stipulated. Schedule 27, Electric Plants. Additions are correctly shown. I added 50% to the Master's values for increased cost of labor and materials.

Schedule 28, Miscellaneous Structures. The exhi¹ it correctly shows additions and retirements. There was no attempt to recompute the values. Considering increased cost and repairs the percentage of condition as good in 1917 as in 1913.

Schedule 29, Engineering on Roadway and Structures. I increased the Master's allowance 30% to cover increased cost of labor.

Schedule 30, Locomotives. I furnished Mr. Fowler the retirements and additions and took his values. I apportioned the value of locomotives to services upon information obtained from the 1504 movement of each locomotive in the time book. The plan followed was the same as in Pltf.'s Ex. 81. My apportionment was correct according to mileage.

Schedule 31, Passenger Train Cars, I furnished Mr. Fowler the additions and retirements and apportioned the value to Michigan on percentages furnished by Relf. The total before apportionment was

\$407,193.

Schedule 32, Freight Train Cars. What I did was the same as for passenger cars. For cars in service a part of the year I used an

apportioned value based on time.

Schedule 33, Miscellaneous Equipment. Using the Master's unit prices for 1913 I increased the value in the same proportion as used by Mr. Fowler and depreciated according to the depreciation charged off on the Company's books. I think 2.5% per year; added items I put in at cost. Pltf.'s Ex. 201 correctly shows retirements and additions. They were proportioned to states on percentages obtained from Delf. The percentage of condition used was a fair average for June 30, 1917, and the prices are fair.

Schedule 34, Ferries and Steam Ships. The value was stipulated. Schedule 35, Engineering on Equipment. The Master allowed 2% of all schedules 30, 31, 32, 33 and I increased his allowance 30%

to 2.6%.

Schedule 36, Terminals. I increased the grading price only. I figured repairs and increased costs would maintain the Master's percent of condition.

Schedule 37, Contingencies; 38 Legal Expenses; 39 Organization and Administraiton; 40 Taxes, and 41 Furniture and Fixtures. Were included at the same amounts as allowed by the Master.

Schedule 30, Interest During Construction. I applied the 1505 Master's rates to the new amounts arrived at by me according

to his formula on pages 197-198 of his report.

Schedule 42, Stores and Supplies. For 1917 I took the average of the inventories for the fiscal years: 1914, \$390,145; 1915, \$326,113; 1916, \$392,828; 1917, \$571,980. The average used I separated to freight, passenger and common on the proportions of the inventory of appraisal attributed to each. Fuel varies greatly, being low in spring and much larger at the close of navigation. This year we spring and much larger at the close of navigation. have a large stock of track material on hand. The item was proportioned between states on the percentages of road miles.
Schedule 43, Working Capital. This represents monthly bal

ances for four years, 1914-1917. I apportioned to Michigan on the

basis of track miles.

The item Appreciation was taken as allowed by the Master and ap-

portioned to services on the same ratio as Sch. 3, Grading.

The unit prices I used appear on page 12, Pltf.'s Ex. 201. I am familiar with prices of labor and material on our line 1914-1916. They were higher in all three years than used by the Master for 1913. As regards the extent of depreciation, the road was in better condition in 1914 as compared with 1913, in 1915 as compared with 1914, and in 1916 as compared with 1915. We have kept making improvements right along.

Cross-examination.

By Mr. Wykes:

Plaintiff's Ex. 201, was prepared exclusively for this case; it starts with the Master's value, then excludes retired property, then adds additions, then affects the quantities with 1917 prices.

In some cases, where previously mentioned, I have used cost The increases shown, due solely to price increases 1913 to 1917, is the difference between columns 2 and 3 and then subtracting the balance from Column 5, or approximately \$3,130,714, with adjustments which will further increase due to stipulations, the Soo Bridge, depreciation, etc. For added property I have used cost price where mentioned. The actual cost price for all added property could be taken from the additions and betterments account. the amount reported to the State as additions and betterments would be the amount of new property not paid for by operating expenses. presume the cumulated figures from the reports 1914-1917 of net amounts of additions and betterments would bring the value down The increase in grading of \$1,000,000 due to increased price would increase the schedule, Interest During Construction, \$90,000. Messrs. Young, Loweth and I, agreed 30% increase for Enginering During Construction would be right. I said the property in 1914 and subsequent years was in better condition than in 1913, because the maintenance was sufficient. The further depreciation where I allowed it was to be conservative. Notwithstanding I decreased some items, other items such as new and increased weight of rail would be on the up-grade and becoming better all the time. In those years we relaid considerable 60 Lb. with 80 lb. rail. old rail was too light for the traffic; we have a lot more to change; we got new and heavier locomotives. In replacing 60 lb. with 80 lb. rail about 25% of the cost of the new rail would go to Additions and Betterments and 75% to Operating Expenses, regardless of the fact that the rail taken out was in a depreciated condition and had cost-say

\$30. I made no special investigation of increased prices of materials, comparing 1913 with subsequent years, but they are just my general idea. I do not know whether 1915 prices fell below 1914. I did not furnish Mr. Fowler the sales prices of locomotives retired and made no investigation of sales prices or amounts received for locomotives scrapped. I know the price of certain track material remained constant up to 1916. My tie prices used for 1917

were taken as the prices for that year. Averaging the four years back to 1913, the result would have been lower. The appraisal, Pltf.'s Ex. 201, as a whole would have been iess for 1917 had the four years after 1913 been averaged. I added for no items omitted by the Master, Riggs or Hansel. I do not recall any but there might have been some. I did not find any omission of sufficient importance to mention.

I made the price of 40¢ for grading sufficiently high to cover the two items, Overhaul and Shrinkage. The 9¢ added to the average cost of ties of 35.8¢ covers hauling, loading and unloading charges. If the I. C. C. rule includes unloading in track laying and surfacing, that would already be taken care of in the prices allowed and that is

true also of hauling and loading.

The work on the Negaunee and Palmer Branch mentioned was by contract but not on bids and the job was submitted to but one person. Bids often vary 40% between the high and low, but it was hard to find any one to do the work that year. The country there was rough, the work confined to one big cut classified as earth, loose rock and solid rock and the haul 700 or 800 feet. The grading amounted to about \$4,000 and was not done by steam shovel. I would not think the instance typical. The \$900 per mile for track laying and surfacing was determined by Young and Loweth; I did not analyze its elements. For ballast increase I also took their prices. On bridges,

the bridge at Brimley, in place 3½ years the conditions taken were: steel 98%, bridge ties and guard rails, 95%, and remainder of structure 100%. I started this bridge new and

depreciated to be conservative.

The excavation and back fill of bridges we did not depreciate with the structure, though to replace it some of the work would be done The cost of additions and betterments made since 1913 is in all instances materially less than the figures I have placed in 1917 values and in many instances as much as a 50% increase has been made. I have taken no structures at less than cost; ordinarily the depreciation I allowed is not enough to reduce the additions from the value included to cost. The inventory of stores and supplies would include those for the purpose of making additions and betterments as well as those for the purpose of maintenance. There is no Though some of the stores and supplies material way I can separate. has been used it is considered as good as new. The base prices for ties are the same figures as reported to the Railroad Commission. To their average I added 9¢ per tie. I understand the report prices include inspection only, but I do not know.

Redirect examination.

By Mr. Tracy:

In Pltf.'s Ex. 201, I took actual cost for each addition so indicated.

1509 Nelson Caderette, recalled.

Direct examination.

By Mr. Tracy:

The correct item for Schedule 31, Passenger Train Cars for Michigan is \$333,584; for Miscellaneous Equipment \$74,316.

Cross-examination:

The shops and shop property located in Michigan are used in repairing all the cars of the line and all assigned to Michigan as being located there. The Thomaston water and fuel stations furnish water and fuel for locomotives running out of the state but they are all assigned to Michigan.

1510 Nelson Caderette recalled.

Direct examination.

By Mr. Tracy:

(Corrected copies of the plaintiff's (Fowler) Exs. 211, 211a, 212, and 213, produced.)

Pltf.'s Exs. 201a, 1914, 201b, 1915; and 201c, 1916, are computations to find the value of plaintiff's Michigan property based on the Master's valuation plus the additions and retirements in each year. I took the Master's values for 1913, deducted retirements at his depreciated value and added additions at cost, where they were shown in Pltf.'s Ex. 201, or at the Master's unit prices where costs were not shown. That applied to all except the equipment schedules and for those I took Mr. Fowler's valuation. The retirements and additions shown are those shown on Pltf.'s Ex. 201. The divisions between passenger and freight and inter an intra state passenger were made by Mr. Delf.

In assigning the locomotives to states and services the 1913 locomotive mileage from the time books was used for 1914, 1915 and 1916, as that gave a less percentage to Michigan than 1917, would have done and we had no data collected for those years. The locomotive values given by Mr. Fowler were for such locomotives as were on the line in 1917 and for 1914, 1915-1916, I have added the locomotives in use at those times but since retired; I added these in at the depreciated values of the Master for the months in use only, e. g. for a locomotive in service in 1913 continuing to 1916, not valued by Mr. Fowler, I took the Master's values and depreciated it 2.5%.

(Pltf.'s Exs. 201a-c introduced in evidence.)

Cross-examination.

By Mr. Wykes:

The figures used for additions from year to year are not the same as reported to the State Boards, which were used by the State in bringing its exhibits to date. They are computed by taking the cost where I could obtain it. I am not sure that would be the figure reported to the State. In other instances they were computed at the unit prices. I made such allocations of property as were made. In the division between freight, common and passenger I carried forward the divisions as divided in Pltf.'s Ex. 201. These exhibits are entirely assembled from Pltf.'s Ex. 201. In the preparation of Ex. 201 where I used unit prices instead of costs I was instructed to take that way as the costs were not available in the company's books in such a way that I could get at it. Many items of cost do not enter into our books at all, e. g. over head expenses.

Dedirect examination:

I did not take costs, in making up Pltf.'s Ex. 201, in making additions as I computed new unit prices according to the higher values of 1917. These amended exhibits 201a-201c were made within the past week.

1512 A. E. Delf, recalled; a witness for plaintiff, before the Court on Nov. —, 1917.

Direct examination.

By Mr. Tracy:

Age, residence and qualifications previously given.

Under the I. C. C. method of accounting when an old bridge is replaced with a new one, the cost of the new structure is charged to the capital account "Road." The ledger cost of the structure retired, if known, or the estimated cost if not known, is charged to operating expenses, the same amount is credited to "Road" and the salvage adjusted. If between 1913 and 1917 new bridges have replaced old ones, that would show up in operating expenses and additions and betterments.

Referring to Schedule 5, Pltf.'s Ex. 201, the expenditures on account of bridges, trestles and culverts, operating expenses (1914, \$45,886) and additions and betterments (1914, \$36,000+) would practically equal the aggregate amount specified as additions.

Where rail is replaced with new rail of the same weight the entire cost is charged to operating expenses and the same account credited with the value of the rail taken out, making no charge to road; if the new rail is of heavier weight, the difference in weight is charged to road and the remainder to operating expenses. Inventories as of June 30, each year, are kept of stores and supplies showing new

material at cost and old rail at scrap prices. The coal supply is lowest in June and highest at the close of navigation. We now (Nov. 1917) have on hand about \$400,000 worth or 70,000 tons, but a small portion of which is represented in the 1917 inventory. It will be consumed before the inventory of June 30, 1918. The ties purchased during fall and winter are in greater part put into the track by June 30. The prices reported to the Commission included the ties along side the track and the inspection cost

1513 before they are moved. They are charged out of the material account when they are actually put into the track. The working capital figures furnished Mr. Caderette are the average monthly balances 1914-1917, not taking into account deposits in connection with this case. They include items accumulated for interest payments. We have had to use this reserve for operating purposes and to borrow money besides. As comptroller I find it necessary to have on hand for working capital the sum set forth in Pltf.'s Ex. 201.

1514 A. E. Delf recalled.

Values for equipment and other items shown in Pltf.'s Ex. 201 was apportioned between states, passenger cars on passenger car mileage; sleeping, dining and observation cars on their respective mileages; freight cars on freight car mileage, and miscellaneous equipment, stores and supplies and working capital on track miles of main line and branches. Ratios of road and car miles are found on page 1 of Pltf.'s Ex. 205. The division by me of Michigan common property between "passenger," and "freight" is shown on sheet 1 of Pltf.'s Ex. 201; Schedule 19, Shops, Engine Houses and Turntables, was divided into shops \$50,067 and engine houses and turntables \$168,679; shops were assigned to passenger and freight on the relation of repairs, to (308) locomotives and (314) freight, (317) passenger and (326) work cars, as shown on D4 of Pltf.'s Ex. 210, 29.26% to passenger. Account is kept of the expenses of repairs to the various classes of equipment and I divided the value of the shops themselves between passenger and freight on the relation of work done in them.

Engine houses and turntables were then subdivided to yard engines, 19a and road engines 19b on the relation of accounts 398 and 400; the amount assigned to yard was divided between passenger and freight, on the relation of the division of account 388 or passenger 2.09%; the amount assigned to road engines was divided on the relation of account 400, engine house expenses road, or passenger 30.02%.

Schedules 20, Shop Machinery and Tools, 42 Stores and Supplies, and 43 Working Capital, were all divided on the relation of the totals arising from the division of all other property schedules except 20, 21, 42, 43, 37 and 40—the overhead basis.

1515 Schedules 22. Water Stations, and 23, Fuel Stations, were divided on the basis of (d16) the fuel used in passenger and freight services as shown on page 8 of Pltf.'s Ex. 210. These

methods were to divide on the basis of the use made in the different

services.

With the exception of the schedules above mentioned and 37 Contingencies and 40 Taxes, the common property was divided to passenger and freight on the modified revenue train mile ratio shown in Pltf.'s Ex. 210, p. 1. This ratio is made up on the one hand of (a) the revenue freight train miles, (b) the freight train switching locomotive miles on common tracks computed from time spent in switching, at six miles per hour; the amount of time spent on common tracks was made up on a series of tests by conductors in 1917 in which it was determined that 58.94% of the switching time of freight trains was on common track. The tests were with the cooperation of the defendants and the percentage agreed to; (c) the freight yard locomotive switching on common tracks, obtained by similar tests, the percentage being agreed to by state representatives.

On the passenger side there is (a) the Michigan revenue passenger train miles and (b) Michigan passenger train locomotive switching on common tracks, the proportion of time being obtained by tests agreed to by the state, plus (c) the mileage of C, & N. W. and C. M. These for 1917 gave a total freight train and switch-& St. P. trains. ing miles of 1,080,134 miles and passenger train and switching of 788,806 miles, or a ratio of 42.41% for passenger of the total train and switch miles. This ratio for the division of common property between passenger and freight was used as it represents the actual use of property by the two classes of trains showing the relation by The division ignores time weight

the respective mileages. and speed. The weight has nothing to do with the use of the property. In the case of a passenger train over 100 miles of track at 27 miles an hour followed by a freight train at 16 miles an hour each would have one complete use of the entire property. The theory is that the revenue train mile represents the unit of use without reference to the destruction of the property, that being taken The switching done on care of in the division of maintenance cost. common tracks only was used, as the ratio is used only to divide common property, the exclusive freight property having been allocated

to freight service.

Schedule 37, Contingencies, was divided on the relation of the divisions of all other schedules except 1, 37 and 40; schedule 40, Taxes, was divided on the relation of totals of all other schedules The details of the division of comexcept 1, 34, 36 and 40 Taxes. mon property are shown on the right of sheet 1, of Pltf,'s Ex. 201. The Michigan passenger property was assigned to interstate and intrastate in the relation borne by the passengers carried one mile in each service to the total passengers one mile, or for 1917, 70.67% intrastate and 29.33% interstate, as shown on Pltf.'s Ex. 205, page The total value of property devoted to Michigan intrastate passenger service is given as \$3,935,976. (Pltf.'s Ex. 201 offered in Pltf.'s Exs. 214-219 inclusive, are Interstate Commerce Commission classifications containing the rules, regulations and instructions by which the plaintiff's accounts are kept. (These exhibits received in evidence.)

Pltf.'s Exs. 202, 203, 204 and 205 are plaintiff's operating statistics used in the various separations of accounts for the years 1914, 1915, 1916 and 1917, respectively, being actual figures taken from the ac-

counts and largely self explanatory. (These exhibits re-

1517 ceived in evidence.)

At the bottom of page 6 of Pltf.'s Ex. 202 "operating expenses" should read "passenger statistics," the rate per passenger per mile should read "cents" and results from the division of the total passenger revenue by the total passenger miles. This represents actual receipts including all classes of travel and mileage books and children.

On page 11 of Pltf.'s Ex. 202, the estimated loss by application of the two cent rate act was arrived at. We analyzed the traffic as to children and adults less than 5 miles, for 1910 and 1913 and it is agreed that the same ratio may be applied to subsequent years. ascertained the amount that would be obtained by the plaintiff at two cents per mile, computing children at half fare, the trips of five miles or less at three cents and the excess over two cents to be obtained on certain interchange business at actual rates and the remainder at two cents per mile, which gave the amount which would be received on a two cent basis; this subtracted from the amount actually received on a three cent basis represents the loss of \$131,299 on the intrastate business had the rate been enforced. We do not take into account any increase or simulation of business by the reduction of fare. the statistics in Pltf.'s Exs. 201-5 (1914-1917) taken from our books, represent the operations of the road.

On page 15 of Pltf.'s Ex. 204, 1916, is a statement of the statistics of travel in Michigan on D. S. S. & A. sleeping cars, giving the number of passengers and passenger miles and revenues in business. They also show the details for foreign sleepers. The only revenue that comes from the foreign sleepers is the proportion of passenger fares,

though we get a rental, as will be later explained. We get all the transportation revenue earned on our lines in those sleepers but none of the sleeping car revenue. We get a hauling charge from the C. & N. W. and C. M. & St. P. Pltf.'s Ex. 205, 1917, contains the same information as 204; Exs. 203-205 are taken from our books and correctly show the statistics they purport to show.

Pltf.'s Ex. 209 covers year ending June 30, 1917; pages 1-4 contain the operating expenses for the entire line and for Michigan and the passenger operating expenses in Michigan. Page 5 shows results of the passenger business in Michigan for that year including total income, expenses, rents, taxes and other payments, the net income, the deduction of the estimated loss and for mail and express and the final figures, the result of the operations if Act 276 had been made effective.

Describing page 1 of Pltf.'s Ex. 209: The first column headed "Account Number" shows the number of the account as designated by the Interstate Commerce Commission. The next column the title

The third column shows the amount of operating expenses assignable to each of the accounts for the entire line.

The fourth column shows the proportion of the operating expenses assignable to the State of Michigan.

The fifth column shows the proportion of those expenses directly

assignable to passenger.

The sixth and seventh columns the portion of the Michigan operating expenses that are common to both freight and passenger, not directly assignable to either service.

The eighth column the percentage proportion of columns 6 and 7

that has been assigned to passenger.

The ninth column has reference to the division, showing how that percentage is arrived at.

percentage is arrived at.

The tenth column is the amount of the common expense assigned to passenger.

The eleventh column is the sum of columns 5 and 10, or the total

Michigan passenger operating expense."

The operating expenses of the railroad are divided into groups as follows: Maintenance of Way & Structures; Maintenance of Equipment; Traffic Expenses, Transportation; Miscellaneous Operations;

and General Expenses.

Under maintenance of way and structures, page 1, Pltf.'s Ex. 209 in first column: "Operating Expenses Entire Line" there is no disagreement between me and the State's Accountants; in the next column "Operating Expenses in Michigan" there is a disagreement in that Mr. Parker assigns \$1,986 less and Mr. Hillman \$479 less to Michigan than I do. In assignment to states we have assigned the expense of the structure, e. g., Marquette shops, to the state in which located: due to a different theory they have not assigned all such expenses to Michigan. After obtaining operating expenses shown in column "Operating Expenses Michigan" the first step to divide between passenger and freight services is to allocate or definitely assign all that can be allocatably assigned. Referring to page 6 of Pltf.'s Ex. 209: to explain method adopted in 1917 to allocate maintenance expenses; in 1915 the l. C. C. required us to separate operating expenses between passenger and freight services as far as possible under rules in Pltf.'s Ex. 217; we did so and Pltf.'s Ex. 209, page 6, shows the result of the allocations and columns 5 of page 1, same exhibit, the result of passenger allocations; columns 6 and 7 on page 1 show common expenses which could not be allocated.

Instructions were issued to the various departments to make definite assignments to freight and passenger when making up their monthly expenses. In the case of the road maintenance,

their monthly expenses. In the case of the road maintenance, blue print books were made for each section, showing the tracks on that section as to freight, passenger and common, the common tracks being shown in white, freight tracks yellow, passenger tracks red. The section foremen were instructed each day to keep track of the labor and material used on each class of track and report it at the end of the month in their time books; turn the time books in to the department to compile the final distribution, and in those departments the assignment is made to the various services, freight, passenger or common.

Page 6, Pltf.'s Ex. 209, is a sta'cment of the cost of the mainte-

nance of way and structures in Michigan, and the portion thereof definitely located to the maintenance of exclusive freight tracks and bridges in one column, and exclusive freight structures other than tracks and bridges in the second column of figures. The third column of figures shows the amount definitely located to exclusive freight structures other than tracks and bridges; the fourth column of figures the total cost of maintenance of exclusive freight tracks and bridges, and the fifth or last column, the total cost of maintenance of exclusive freight structures other than tracks and bridges.

This separation as to exclusive freight tracks, bridges and other structures was made to ascertain percentages to assign the 1914, 1915

and 1916 maintenance costs to exclusive freight tracks.

Q. Now, I will ask you whether the column footings \$53,102 and \$45,000 represent the amount of money as shown by the reports of the maintenance of way department which was spent in maintaining exclusive freight tracks and structures in the year 1917?

1521 A. With the exception of two of the accounts, 208 bridges, trestles and culverts and accounts 272, removing snow, sand

and ice, they do.

Account 208, "Bridges, Trestles and Culverts"; in our assignments we had evidently overlooked the assignment of a bridge at Walsh's Siding to exclusive freight, and some other bridges that served two tracks, a common track and a freight track, had evidently been assigned to common, and portions should have been assigned to freight. Those errors were discovered by the accountants for the State and my attention called to them and the correction made. In the account "Removing snow, sand and ice," the assignments were made in accordance with instructions by the section men. When the accountants for the State went into the detail of it, they questioned its accuracy, calling special attention to the assignment to the Marquette yards. I do not know that there was any reason to doubt the accuracy of the assignment and the result, I do not think, represented the true condition. For instance, the main line running through the Marquette yards has leading off from it numerous freight spurs. Under the instructions, very naturally the section foremen would report that main line as common track, but a large portion of the snow shovelling of the common track would be cleaning out frogs and switches leading off from it to the freight spurs, and therefore, really would be freight-assignable to freight service rather than the common track, and it was agreed between the accountants for the State and myself that we would adopt an arbitrary assignment of one per cent of the total of that account for passenger, 29% for freight and the balance assigned to common, which was done in this year and in each of the other years, 1914, 1915 and 1916.

Except for these two accounts the figures on page 6 of the Exhibit show the actual allocations to the extent as made by

our maintenance force.

The next, fourth column, totaled \$56,123, has opposite one or two accounts matters which was not in the preceding account; account 201 could not be definiately assigned to either service; it is all common. Account 269, "Roadway Tools and Supplies," the same; Ac-

count 271, "Small Tools and Supplies," the same; Account 276, "Stationery and Printing," the same, and 277 "Other Expenses," the same. These five accounts are all common, but a portion of the expense of those accounts should be assigned to the cost of the exclusive tracks, and they have been assigned by me on the overhead basis.

Q. And the relation of that portion of the expenses is allocated to the exclusive freight structures and tracks as compared with the total

expense?

A. The total Michigan expense, yes, excluding these accounts.

In accordance with I. C. C. rules, effective July 1, 1915, we began to make assignments of track work expenses in Feb. 1916, and to June 30, 1917, definite assignments were made. We did not find the expenses of maintenance of exclusive freight tracks for other years than 1917; it was mingled in one account and was not allocated or separately reported. We therefore took the percentages which the assignments for maintenance of exclusive freight tracks in 1917 bore to the total maintenance of each of the accounts and applied that per-

centage to the total of the like accounts in 1914, 1915 and 1523 1916. This appears on page 7 of Pltf.'s Ex. 209. For ex-

ample, Account 212, Ties, the total Michigan expenses in 1917 was \$60,335, and the exclusive freight tracks portion \$8,893 or 14.74% of the total. In 1916 the total tie expense was \$56,379, of which we assigned 14.74% to exclusive freight and the same for 1915 and 1914. This is typical of the way assignments were made for all other accounts.

On Pltf.'s Ex. 209, the common expenses were assigned to passenger and freight, those under the caption "Common" in column (1) being upon the modified revenue train mile basis, and those in column (2) on other bases. Accounts 231, Water Stations and 233, Fuel Stations, were assigned on the relation of fuel consumption in the two services shown in Division 16. (Page 8, Pltf.'s Ex. 210.)

Account 235, Shops and Engine Houses, was divided on division D 17, shown on page 9 of that exhibit. The shop part of the expense being assigned in the relation of the equipment repair accounts—division D4—and the engine house expenses on the relation of Accounts 388 and 400 being the yard and train engine house expenses.

Account 275, Insurance, is assigned on Division 18, according to the allocation of the property on which the insurance is paid.

All other expenses under caption "Common" (2), are assigned on division 2, page 1, Pltf.'s Ex. 210, which is overhead to or in relation of, the totals of the division of all other accounts in the maintenance of way and structures group, except 201, 244, 269, 271, 274, 276, 277, 278, 279. Pltf.'s Ex. 209, page 6: the division into columns shown is not with reference to 1917 but to ascertain the ratio

or total to each account that the maintenance of exclusive freight tracks was in 1917, to obtain a ratio to apply to 1914,

1915 and 1916, where we had no ratio.

Pltf.'s Ex. 219, is a track chart of Houghton division. I have found three minor errors in this, two uncorrected. The two uncorrected affected 1.85 miles or between 1 and 2% of the total freight track mileage and the effect is to increase the amount I have charged

to maintenance of exclusive freight tracks between \$500 and \$1000. Ratios D16, D17 and D18 used in dividing certain common maintenance of way expenses between passenger and freight were adopted and used to divide the repairs of water and fuel stations in the relation of the passenger and freight uses of the properties, making a direct connection between the use and the repairs and dividing the repairs directly in accordance with the use. Repairs to shops and engine houses were divided in the relation that the repairs to the equipment in each service bore to each other or the total and adopted

because I was able to find the use unit.

The greater portion of the common maintenance of way and structures expense items which were divided on the modified revenue train mile ratio (D1) are due to weather or the elements and that portion of the expenses should properly be assigned to passenger and freight on the use of the property by them. The balance of the expense must be divided, and while I am aware that freight trains are longer and contain more cars than passenger trains, my opinion is that owing to the greater speed of the passenger train and the track refinements required for it, the fact that in some of our passenger trains our heaviest engines are employed, and that the removal of sand, snow and ice on the common tracks is necessitated by, and causes

more expense due to, the passenger than the freight service, these reasons offset the fact that the freight trains are longer and heavier and contain more cars than the passenger trains.

The locomotive ton mile method has, in a number of instances, been used to divide common maintenance of way expenses. It is the weight of the locomotive and tender load multiplied by the number of miles run. The reason for its use is that it is claimed that the great destructive element of the train is the locomotive. I have investigated the locomotive ton mile ratio as applied to plaintiff. The passenger percentage, as compared with the modified revenue train mile ratio would be:

Year.	Locomotive ton mile.	Modified revenue train mile.
1917	43.9%	42.31%
1916	46.7	44.63
1915	50.+	48.65
1914	48.2	45.09

(The correct locomotive ton mile ratio apparently excludes the tender.)

On the maintenance of way and structures expenses for 1917, Parker's assignment to passenger is \$89,000 less and Hillman's \$74,000 less than assigned by me. This is due principally to my division of items on the modified revenue train mile ratio (D1) and to their allocation of expenses of exclusive freight tracks by setting off 17+% of those items to such tracks. Those two differences account for the greater part of the difference between us.

Under maintenance of equipment expenses, Pltf.'s Ex. 209, page 2: there is no difference between myself and the State's Accountants in the total of the first column "Operating Expenses Entire Line."

Parker assigns \$225 less and Hillman \$190 more to Michigan than I do. On the total amount assigned to passenger Parker's figures were \$3100 less and Hillman's \$2600 less than my assignment.

The difference is due to the assignment of work equipmentrepairs, that item having been divided by each of us on the ratio of maintenance of way and structures accounts and we varied on these divisions.

Under traffic expenses both parties are in accord throughout.

Under transportation expenses, both parties are in accord on the first column "Operating Expenses Entire Line." In the operating expenses assigned to Michigan, Parker's figures are \$5,800 less and Hillman's \$4,800 less than mine. In general the difference is due to assignments in Accounts 392, Train Enginemen, and 401, Trainmen. My method was: in 1917 Account 392, automatically assigns itself to freight, passenger and mixed service and the wages of engine men who run wholly in Michigan, are assigned to Michigan. On the four trains running in two states the wages of enginemen were assigned by me according to the miles run in each state. The same general explanation applies to Account 401. On account 394, Fuel for Train Locomotives, there is a difference of about \$200. In the last column, page 3, Pltf.'s Ex. 209, "Total passenger operating expenses," Parker's figures assigned \$25,600 less and Hillman \$24,900 less to passenger than I did. About \$21,000 of this difference is due to Account 373, "Station Employees." My method was: the allocations to passenger, freight and common were agreed to. The common was assigned by me on ratio D6, which is self explanatory and gave for 1917 37.31% to passenger. It is difficult to determine a ratio to divide common expenses of station employees. In the smaller stations there is usually one or two men whose services are in both passenger and freight work and it is impossible to determine accurately the amount of

service devoted to either. The revenue train mile indicates the trains over the track and the number of times each class of trains enters or passes the stations. I have added the switching miles on all tracks to put the full proportion onto the freight. In Account 376. Station Supplies and Expenses, a difference exists and I have divided the same way as Account 373. On Account 372, dispatching trains, the State's figures are about \$2,000 less than mine. I divided on ratio D6, the same as for Station Employees, that being train miles, plus switching. If the accounts Station Employees, Stations Supplies and Expenses and Dispatching Trains was agreed upon there would be little difference in the total of transportation expenses Under group "Miscellaneous Operations," assigned to passenger. added to the classification in 1915, there is no difference between the parties. Before 1915 these items were carried as the Account "Outside Operations."

Under the group "General Expenses" page 4, Pltf.'s Ex. 209, there is no material difference between the parties, Parker's figures in the second column being \$350 less and Hillman's \$180 less than mine. I excluded from 454 "Law Expenses" the expenses of this litigation. In the column "Total Passenger Operating Expenses"

Parker's figure was \$3600 less and Hillman's \$3300 less than mine, due to the theory of dividing that account "Overhead" to all the Company's expenses. My ratio is D14, page 8, Pltf.'s Ex. 210, for 1917 31.06% passenger. The total difference between the State's accountants and myself as shown by the summaries for 1917 are: in the column "Operating Expenses Entire Line" none; in column "Operating Expenses Michigan," Parker \$8,400 less, Hillman \$5200 less. In column "Total Michigan passenger operating expenses."

Parker \$122,000 less and Hillman \$10,000 less than mine. 1528 The principal differences are those shown in the maintenance group and in the three accounts of Transportation Expenses.

Plaintiff's Ex. 209, page 5: There is little difference between the State's accountants and me on the revenue accounts they bring in. It is \$306 in the account "Hire of Equipment." They do not bring in as revenue accounts mail, express, sleeping, dining and chair car revenues. The interest included does not include that on the "rate case fund."

Plaintiff's Ex. 210, page 13: This shows division of passenger expenses to intrastate and interstate services, though some percentages

are emitted.

Accounts "Outside Agencies" and "Advertising" under "Traffic Expenses" were assigned by stipulation, and the parties agreed. "Station Employees" and "Station Supplies and Expenses" were assigned by me 88.70% to intrastate on the relation of the number of passengers carried interstate and intrastate, regardless of the dis-The number of intrastate tickets sold at these statances traveled. tions is far in excess of the proportion assigned in this to intrastate So far as wages and expenses of station employees and the station supplies and expenses are concerned, it does not make any difference the length of journey the passenger has taken or is about to take when he uses those stations. I have divided on the relation of the passengers traveling, rather than on the miles traveled. property in the stations was divided on the passenger miles, or 70.67% intrastate as against 88.70% used for station employees. All expense of Soo Bridge operation is assigned to interstate.

Accounts "Operating Sleeping Cars" and "Sleeping Car Repairs and Depreciation" were porportioned on the miles of passengers traveling in D. S. S. & A. sleepers, as shown on page 14, plaintiff's Ex. 205, 33.28% to intrastate. The remaining passenger expenses were divided on the basis of the passengers one mile in the entire intractate service, or 70.67% intrastate, shown for 1917 on page 8, plaintiff's Ex. 205.

1529Plaintiff's Ex. 209, page 5: In column "Intrastate" totaling \$733,049, my revenue figures are the same as those of the State accountants, except Mail, Express, Sleeping, Dining and Chair Car revenues, which they do not bring in, and the Hire of Equipment, where I have assigned \$1,945 and Parker \$1,731 to intrastate. In the item "Rents Paid for Hire of Equipment" I assigned to intrastate \$1,165; Parker assigned \$294; he excludes rental paid for sleepers, which I include.

The method of ascertaining the taxes paid to Michigan for each year is shown on page 12, plaintiff's Ex. 210. In actual accounting, the taxes are carried ahead as an estimated amount, and charged up each month. Looking back, I would say that taxes would be more than I estimated for 1917, as I used the basis of \$187,000, and Michigan taxes have been about \$200,000. The taxes are assessed against the railroad as a whole, and were divided between services in the proportions in which the property was divided, first deducting Schedules 34, Ferries, and 36, Soo Depot, which are separate corporations, paying their own taxes. This assigns 31.03% of the taxes to the passenger service. The passenger result was then divided to interstate and intrastate on the passenger miles.

Plaintiff's Ex. 209, page 5, shows the net income, deduction of the

estimated loss, and the mail and express loss, and final results.

It was stipulated between the parties that, for the purpose of preparing exhibits and showing operating statistics to be used on this hearing, 10.92% of the total Michigan operating expenses would be considered as due to the mail and express business. Taking this percentage, which was that adopted by the Master, this business in 1917 would show a loss of \$6,159. The division between inter and intrastate is purely arbitrary, the revenue and expenses

being divided in proportion to interstate and intrastate pas-

senger revenue and expenses respectively.

1531 DELF.

Direct examination continued:

Pltf.'s Ex. 206 (1914) is the same as Pltf.'s Ex. 209 (1917), except that it applies to operations of 1914; 1914 is under the old I. C. C. classification and 1915-1917 under the new; the groupings of expenses are substantially the same under both classifications. 1914 we did not have in the books expenses attributable to exclusive freight track maintenance. We were able to separate for freight, structure:. The amount directly assignable to freight does not appear on Pltf.'s Ex. 206. The assignment of the passenger proportion of common expenses of maintenance of way was made in substantially the same way in 1914 as in 1917. The column "Operating Expenses" includes expenses of maintenance of exclusive freight Column "Total Michigan Operating Expenses" is excessive to the extent that it includes a part of the expenses of maintenance of exclusive freight tracks. After making this assignment we deduct the excessive amount from the total obtaining the amount as shown on page 7, Pltf.'s Ex. 209. After having ascertained the cost of maintenance of exclusive freight tracks in 1914, at \$47,720 I deducted from the total Michigan passenger expenses 45,09%, of that or \$21,517, which was the proportion of expenses assignable to passenger under division D1 in 1914. The proper method would have been to deduct the whole \$47,720 from common expense item by item before the division, but the same result is arrived at by subtracting the later. The deduction is in fact excessive by the difference between 42.39% and 45.09%.

The differences between the State's accountants and myself on the

figures in Pltf.'s Ex. 206, are:

Page 1, first column, none; second column in totals, Parker shows

\$5.401 less and Hillman, \$15,094 less than I do. This is due to my allocating all expenses of maintenance of structures located in the State of Michigan and their having adopted another method. In the last column "Total Michigan Passenger Operating Expenses," Parker's figures are \$97,000 and Hillman's \$82,600 less than mine due principally to (a) the different method of ascertaining the maintenance expense of exclusive freight tracks, and (b) to their dividing common expenses on a different ratio. The differences in theory in the accounts of 1914, are substantially the same as in 1917.

On page 2, Pltf.'s Ex. 206, the differences in maintenance of equipment between us are: first column, none; second column, substantial agreement; last column, Parker \$1,847 less and Hillman

\$1,371 less than mine.

The difference is due to the assignment of work equipment-repairs, overhead to the maintenance of way and structures expense. On traffic expenses we correspond colsely. Under transportation expenses page 3, Pltf.'s Ex. 206, the differences occur in substantially the same accounts as in 1917 and are: first column none; second column, Parker \$300 less and Hillman \$3 less than mine; last column "Total Michigan Operating Expenses," Parker \$23,600 less and Hillman \$22,900 less than mine, the difference being largely due to assignment of accounts 63, Station Employees, and 68, Dispatching trains, also 66, Station Supplies and Expenses. The differences under "General expenses," page 4, Pltf.'s Ex. 206, are: in first column, none; second column, Parker \$296 less and Hillman \$487 less than mine; in last column, Parker \$5.200 less and Hillman \$4,100 less than mine, the differences being due to the making of the assignment of general expenses as overhead to preceding accounts.

1533 In the 1914 passenger revenue, page 5, Phtf.'s Ex. 206, the difference from the State's Accountants are: in total Michigan passenger revenue, none. In other items down to taxes, all in

the first column, are the same except operating expenses.

The 1914 method for assigning taxes to passenger are the same as for 1917 based upon the valuation of the property. Passenger operating expenses are divided between intrastate and interstate in 1914 in the same way and with the same ratios as in 1917, and the estimated passenger loss and mail and express results were computed in the same manner. Pltf.'s Ex. 207, page 1, shows accounts for 1915. The method of setting off exclusive freight track maintenance is the same as for 1914. In the maintenance of way and structures group differences between myself and the State's accountants are: first column, none; second column, Parker \$211 more and Hillman \$259 more than mine; last column, Parker \$76,760 less and Hillman \$59,800 less than my assignment; the reasons for the differences there are substantially the same as in 1914 and 1917.

Under the maintenance of equipment group the differences are: first column none; second column, "Michigan Operating Expenses," Parker \$20 less, and Hillman \$107 more than mine; last column, Parker \$1510 less and Hillman \$970 less. Reasons the same as for 1917. Traffic expenses, no difference. Transportation expenses, first column, none; second column, Parker \$30 more, Hillman.

\$1,070 more, last column Parker \$23,000 less, and Hillman \$22,800 less. The differences are due to the same reasons as in 1917. Miscellaneous expenses show no difference. General expenses, first column, no difference; second column, Parker \$830 less and Hillman \$710 less than I. Last column Parker, \$4,880 less and Hillman \$3,680 less. Due to the same causes as in 1917 and 1914.

The differences in the summary for 1915 are: first column, none, second column, Parker \$615 less, Hillman \$728 more; last column, Parker \$106,163 less and Hillman \$87,305 less than mine. In the summary Parker's totals were \$106,163 less

and Hillman's \$87,305 less than mine.

On page 5, of Pltf.'s Ex. 207, the differences in first column down to taxes, are: in "rents received for hire of epuipment" Parker \$237 more, in "interest" \$110 more than mine. On "Rents Received for Joint Facilities," Parker assigns part of the amount to the Mineral Range operations under joint facilities; excluding the Mineral Range the difference is \$1,478; on "Rents Paid for Hire of Equipment," Parker assigns no portion of the rent paid for sleepers and the difference is \$1,286. The operating expense item and the taxes I apportioned taxes the same as for 1917. In the are different. column headed "Intrastate" Parker assigns no mail, express, sleeping, dining or chair car revenues, to intrastate and the "Rents Received for Hire of Equipment, Joint Facilities" and "Interest" differ owing to the total Michigan differing. The estimated loss for 1915 and the mail and express division was arrived at for 1915 as for other years.

Pltf.'s Ex. 208, operations of 1916: in maintenance of way and structures group, the maintenance expenses of exclusive tracks was arrived at in the same manner as for 1914 and 1915. In that group the differences between me and the State's Accountants are: first column, none; second column Parker \$3,340 less, Hillman, \$1,644 less due to the same causes as for 1915. In the last column the differences in totals are: Parker \$76,900 less and Hillman \$53,900 less,

in general due to the same reasons as for 1917.

In maintenance of equipment group the differences are: first column, none, second column, Parker \$200 less; Hillman \$210 1535 less; the last column Parker \$1,800 less, Hillman \$1,380 less due to same causes as in other years. In traffic expenses

there is no difference.

Under transportation expenses the differences are: first column none, second column, Parker \$3,200 less, Hillman \$2,580 less than I, being substantially the same differences as in 1917. In the last column, Parker's figures are \$21,164 less and Hillman's \$20,655 less than mine.

Under miscellaneous operations our figures agree throughout. Under general expenses, the differences are: first column, none, second column, Parker \$170 less and Hillman \$100 less.

Column "Total Michigan Passenger," Parker \$3,933 less and

Hillman \$2,655 less than mine.

In the summary, second column, Parker \$6,838 less, Hillman \$5,530 less.

Total Michigan passenger, Parker's figures \$103,877 less and Hillman \$78,675 less.

Page 5, Pltf.'s Ex. 208 was prepared in the same way and shows

the same things as the other similar exhibits.

Pltf.'s Exs. 206, 207, 208, and 209, were prepared from our books of accounts and operating statistics and the calculations are properly

made. (The exhibits were offered in evidence.)

In November 1916, the basis on mail pay was changed, reducing our mail revenue from \$72,000 to \$42,000 per annum. I believe from my study of the question that there will be a loss as estimated if Act 276 is put into effect. In 1914 the increase in Michigan passenger revenues was governed to a large extent by the copper country strike from July 1913 to February 1914. Upon closing the

copper mines many miners got out of the country and went 1536 to other points on the South Shore, strike breakers and state troups were taken in and there was a large traffic back and forth during the strike. In addition they had a prosperous year in

all lines of business.

The total operating revenue of the line for three months ending Sept. 30, 1917, as compared with the same period in 1916, shows an increase in revenue of \$166,700, and an increase in expenses of \$228,400. I have not the Michigan figures nor have I divided between passenger and freight. I have taken from the reports of the Michigan Railroad Commission various operating statistics for the fiscal years, ended June 30, as follows:

Michigan Passengers Carried One Mile per Mile of Road.

R. R.	1911.	1912.	1913.	1914.	1915.
Mich. Cen.	197,732	203,968	214,246	226,881	222,795
G. R. & I.	159,075	161,987	169,722	175,639	164,541
D. S. S. & A.	74,721	72,238	777,337	88,524	67,493
Passenger Tr	rain Revenue	Passenger Train Revenue per Mile of Road	oad.		
Mieh. Cen.	4,751	4,842	5,344	5,662	5,626
G. R. & I.	3,370	3,461	3,716	3,896	3,729
D. S. S. & A.	2,199	2,068	2,194	2,458	2,027
Tons of Frei	ight Carried	Tons of Freight Carried per Mile of Road	ad.		
Mich. Cen. G. R. & I. D. S. S. & A.	1,402,869 738,139 401,204	1,388,946 698,869 399,888	1,639,858 767,457 426,915		1,400,755 676,739 367,355
Freight	Revenue per	Freight Revenue per Mile of Road.			
Mich. Cen.	8,862	9,338	12,653		10,019
D. S. S. & A.	3,587	3,639	3,894		3,144

1537 Statement of Coal Cost in Sept., 1917, as Compared with Sept., 1918.

Year.	Tons.	Cost per ton.	Total cost.
1917	3300	\$5.65	\$18,648
1916	3129	3.05	9,543

I understand the 1917 coal is not as good as last year. Our reported prices for ties consists of the amounts we paid contractors to get out the ties plus the cost of inspection only.

Cross-examination.

By Mr. Wykes:

In order to compare our statistics with those of the other roads enumerated, the proper elements to determine the value of the comparison would be: comparative cost of construction per mile and comparative cost of maintenance and operation. I do not think it would be necessary to know whether these particular companies are carrying at the two cent rate with a considerable profit or not. I did not investigate the extent of their profit. The tabulation is to indicate that other companies carrying passengers at two cents a mile are in a better condition to do so than the South Shore, as they have a greater traffic. The indication is that if the plaintiff makes a profit out of 67,000 passengers per mile the Michigan Central makes an excessive profit out of 222,000 passengers per mile.

As bearing on working capital, plaintiff has one fund from which it draws current funds for use in carrying on the railroad business; the money is in the bank subject to the check of the treasurer and

would bear the burden of paying interest, etc.

Schedule 19 on Pltf.'s Ex. 201, is shops, located in Michigan but used to repair the equipment worn out on the entire line regardless of place. While freight equipment may be repaired at Superior we have no shops to balance the shops in Michigan. I have assigned no part of the property in shops or of the expenses of their maintenance or taxes outside of Michigan.

The general practice in the appraisal has been to assign to Michigan, property there located, though engaged in serving the business of the entire line; the same is true of the expenses of

maintenance of the property.

Schedule 42, Stores and Supplies, were assigned on a road mile basis made up of mileage of main line, exclusive — freight track and traffic spurs on the theory that they are necessary for use in the maintenance of the road. Due to the fact that 66 miles of the traffic spurs fall in Michigan and a less proportion to main line in Wisconsin, and that the ratio of maintenance of exclusive freight track to main line is about as one to three, there possibly should be an adjustment for that item of mileage. The same thing may be true to a greater or less degree of miscellaneous equipment, and which

is a signed on the basis of road mileage and used in the repair and maintenance of the line. It is not necessarily true of working capital as that represents all the traffic moved off the spur tracks.

On Pltf.'s Ex. 209, page 1, the second column headed "Operating expenses, Michigan" differs from Parker's and Hillman's in part because of my making no assignment of items in Michigan used in the common service of the line to business outside the state, together with differences arising out of those in applying overheads. I do not know what per cent my operating expenses shown in this column should be reduced if such assignment were made. I think the Master made this assignment on the road mile basis. After finding the Michigan expenses, my next step was to allocate as far as I could to services. While my tabulation shows what was allocated and assigned to passenger it does not show what was allocated and assigned to freight, though it might be computed from the exhibit. We did set off a certain amount to exclusive tracks in 1913—we made

a guess at it assuming the cost of maintaining a mile of main 1539—line was three times the cost of maintaining a mile of side track; that the cost of maintaining a mile of exclusive mine freight track was \$375, the cost of maintaining a mile of industrial spur freight track was \$300. We equated the mileage of the side tracks by dividing by three, added the resultant to the total main line mileage; then we took the total maintenance cost and deducted from that the cost of maintaining the industrial tracks and the mine tracks to get at the cost of maintaining the main line and the sidings. We divided that result by the equated mileage of the main line and sidings to get at the cost per mile of maintaining the main line and sidings; then we applied that cost to the equated side tracks freight and passenger, and added to that the cost of maintaining the exclusive mine tracks and industrial tracks and took that as the total cost of maintaining the exclusive freight tracks.

We based a three to one equation on the testimony of Messrs. Lytle, Young and other witnesses. It resulted in assigning about 12.5% of the total maintenance cost to exclusive freight. Under our present method we assign to exclusive freight 1916, 8.63%, 1915, 7.83%, 1914, 8.42%, taking the total Michigan cost and comparing

with the total freight cost.

For 1917 the separation of exclusive freight track expenses was based upon investigations under the I. C. C. order of 1915. We got the system in operation for the year 1916 and used the blue print, Pltf.'s Ex. 219. This method did not result in as much expense being assigned to exclusive freight track maintenance as testified to by Lytle, Young and others, though it does not necessarily disprove their claims. The effect of the previous method was to attribute to the exclusive freight tracks a portion of the expense of structures not located on those tracks. There is nothing on the blue print (Ex. 219) to indicate that any part of the expense of

1540 the maintenance of the switch as it intersects the main line is to go to or with the exclusive property, which makes it necessary. I do not think the blue print (Pltf.'s Ex. 219) in the hands of section-men might indicate that the switch might go with the

main line. I think the instructions in another book take care of that. I should say when he put- in a switch leading off to a freight spur his instructions are to report material used in the freight spur as freight, and it was intended that he should put it in the freight col-Our section-men are about the average of intelligence for that class of labor. I think they endeavor to do the best they can. the instructions (Defts.' Exs. 335-336) on page 3, the heading "Used for Repairs" is divided into three columns "Exclusive Freight Tracks," "Exclusive Passenger Tracks" and "Common Tracks." The instructions are plain. The front of the red cover, reads under the heading "Used for Repairs"; "Enter opposite each article the quantity of material actually used for repairs during the month on account of ballast, ties, etc. Particular care should be taken to enter in the proper column materials used on exclusive freight, exclusive passenger, or common track.' The section men must know which the exclusive track is and what the instructions are, and he would then be able to make proper distribution. The blue print, Pltf.'s Ex. 219, indicates which tracks are designated as freight. The section man would know what freight tracks, including the frog joining it to the main line, was freight track. None of our men were told the point in main line to which the exclusive freight track should go. I do not think blue print, Pltf.'s Ex. 219, misleading, the section man would know where the track began and ended. There may be difficulty at times in telling what is exclusive and what is common track. The switch runs into the common property where it joins

the main line and, as to whether instructions should have been more detailed, I think too voluminous instructions do not get as good results as when you make them short and leave it to the common sense of the man doing track work all the time. There is no way of testing out the reports of the men in labor and material used in maintenance of exclusive tracks, except by doing the work over again, every other means is a guess. As to whether divisions of expenses between exclusive freight and common, and between freight and passenger are arbitrary, and in the nature of guesses, I would say arbitrary divisions must necessarily be matters of opinion to large extent. If the man has had experience in the work and of the operations in which he is making estimates they are not all together guesses. Mr. Lytle's estimate of a 3 to 1 equation for certain kinds of

have been all right, but the error would occur in our application of it. In speaking of the reason for the differences in the amounts assigned to Michigan for transportation expenses by myself and by the State's accountants, I did not separate the trains crossing the State line from Thomaston west and divide on the mileage of trains. Each engineer's time is kept separate and the engineman who ran only in Michigan his entire time was assigned to Michigan. The enginemen who run in two states their wages are assigned between the states on the mileage of the runs in each State. The run of the enginemen into Wisconsin began at Thomaston usually. The enginemen are required to report for duty a certain length of time before they take their trains. If there is waiting time at the beginning or end of the

track, \$300 a mile for another kind, and \$375 for another, might

run, my method would not necessarily charge Michigan with too much of the expense because the same thing occurs at the other end of the line. The waiting time would be divided between the crews on the miles run and Michigan would get its entire end for the short haul, Thomaston to the State line; Wisconsin

would get its end as against a much longer haul.

I divide dispatching trains under transportation expenses, between passenger and freight on formula D6, train mileage plus all switch-In making my divisions I have proceeded upon the theory that the time of the dispatcher's office and the expense of dispatching trains relates solely to trains and switching. They do send general messages for the operation of the road. I also divide the common portion of station employees upon ratio D6, train miles plus switching. At six stations—Sault St. Marie, St. Ignace, Marquette, Negaunee, Ishpeming, Houghton and the Marquette Ore Dock Agency—we were able to allocate a considerable amount of the station employee's The difference between myself and Parker and Hillman is that they divide the common portion of that item on the basis of The common portion of the item is made up the allocated amounts. aimost entirely of stations other than those I have mentioned. They assign the common stations other than those mentioned, on the relation of the allocations at stations which have no connection with the other stations though they are all embraced in the same account.

For each year I have used the modified revenue train mile division for the larger part of the common expenses; that accounts for a large part of the difference between myself and Parker and Hillman. Originally—in the earlier years—we divided the items which I now divide on the modified revenue train mile ratio upon the straight train mile ratio. We had made that assignment for use for statistical purposes

from 1890.

We took that ratio, that we had been using for years, and applied I do not know whether there is any other ratio that would give a larger proportion of expense to passenger. This was the ratio used by the principal roads of the United States for that same division; it was used for a long time for comparative statistical purposes; we had used it for such useful purposes as we thought proper—for comparative statistical purposes. The present modification of the revenue train mile basis is to take into it a certain proportion of the switching and stational mileage. It assigns to the passenger service a greater proportion of expense than the straight revenue train mile ratio plus switching or my ratio D6. D6 made up of the revenue train mile plus switching takes in switching on exclusive tracks and we are only trying to divide expenses on common Locomotives running light are not included in the train mileage, though they would have the same protection from the dispatcher's office as a train and would perform a complete operation over the portion of the track they used. A large proportion of the engines running light would be in freight service. I made no modification to take into account the load behind the locomotive or the greater number of cars in one service over the other. In passenger trains the average number of cars in passenger trains is 4.7, and in

freight trains 20 to 22.5 (1916-1917). I have made no adjustment in my ratio, between the time I first prepared it and the present, to take into account the increasing length of freight trains during the period intervening between its first preparation and the present. There is no modification to take account of the different character of equipment in the two services—the less perfection of equipment in freight and the greater perfection in passenger service. The ratio is not modified at all; the actual mileage is taken and used, except for the use of the portion of switching on the common tracks.

In setting off exclusive track switching we required the reports from train men intended to set forth the amount of stational work or switching on common tracks and on exclusive tracks. We

1544 required the freight conductors to show the total amount of switching at various stations; the amount on exclusive track; the amount on common track and the location of the train during the switching. The reports show that the train was left on the common track the major portion of the time. I have not computed the percentage to know that it was 97% of the time. In computing the modified revenue train mile ratio I did not in any way give effect to the use of the common tracks by the trains standing on it during 97% of the time, when the rest of the train was engaged in stational work. In the two columns relating to the time of switching on common track and on exclusive track, we instructed the conductors to report the time engaged in switching, without any reference to standing time.

We asked no separation between standing and moving time, I assume they reported what we asked—the time engaged in switching. No division was made of the standing time and moving time in the switching operations. Not having the standing time we could make no such division. While they were unloading freight at a station I do not think the standing time would be included in switching time, though I do not know personally. The reports will show whether the switching time on common and exclusive tracks equals the total time spent at the station. Originally plaintiff's proofs showed about 39% on the average, of the time of freight trains as engaged in stational work. That was largely estimated, being testified to by each train conductor for his train and was then mathematically computed from the testimony. To get the present modified ratio that 39% has now in effect been reduced by taking out of the stational time the

operations on exclusive tracks. The time engaged in switching on common tracks is then computed, at six miles per hour and is added to the train mileage which is made at an average of 16 miles an hour. In 1915 the passenger proportion of the revenue train mileage is 53.9%, and of my modified revenue train mile ratio is 48.65%, a difference of 5.3% of the total train miles. By the modifications the passenger proportion of the expenses have been decreased about 5.3% under what they would be by the straight revenue train mile ratio. With regard to the revenue train mile ratio for the division of common expenses I do not know how close to actual results it gets. If we knew actual conditions we would not be using the modified revenue train mile or any other train mile ratio. No-

body knows the margin of error in the ratio used. I make no elimination of the cost of operation over the Mineral Range but we include the cost of operation of our through trains to Calumet in our

passenger operations.

We operate a number of through passenger trains that are delivered to us by the Chicago & Northwestern at Negaunee, and the Chicago, Milwaukee & St. Paul at Champion, through to Calumet; we put our crews on them at Negaunee and Champion and operate them through to Calumet. The revenue accruing therefrom comes to the D. S. S. & A; those trains become our trains for the purposes of operation, and as they run through to Calumet over fourteen miles of the Mineral Range Railroad, and are operated over that road by the D. S. S. & A. and D. S. S. & A. crews, we include in our passenger operations the cost of that operation over the Mineral Range road. We bearthe cost of the train men, engine men, and the fuel consumed by the locomotives because the D. S. S. & A. receives the revenue from those trains while on its tracks, and in addition a bonus from the Chicago, Milwaukee

& St. Paul, and the Chicago & Northwestern of \$14,000 a year 1546 for running those trains; for taking the other companies' trains and running them over our track they pay us \$14,000 a year in addition to giving us all the revenue from the trains.

The Mineral Range receives the passenger train revenue earned on that line. They charge us nothing for the trackage over their line, but we guarantee that their revenue shall equal forty cents a train mile, if it does not we make it up. As a fact, it does; therefore there is no expense to the D. S. S. & A. for operating this train over the Mineral Range tracks, except whatever cost may be incurred through its employees operating the train and the coal that is consumed. The bonus is credited to our passenger revenue, or it has that effect, part of it; 75 per cent of it is credited to revenue and 25 per cent to maintenance under the Interstate Commerce Commission rulings. The effect is to credit the total amount, \$14,000, to our passenger operations.

It is in consideration of our running those trains through to Calumet that the arrangement is made; we have not attempted to show what portion of that cost should be attributed to the Mineral Range. Our operating cost is increased by the expense of our train crews, fuel and supplies used in running the trains. We pay all the train men; the Mineral Range collects its own fares and receives the entire revenue except the rental. The Mineral Range maintains its own line and the only expense we are put to is the operation of the train. We would pay our conductors and trainmen the same wages whether we ran through to Calumet or Houghton; there was no overtime. The engines are ours; the equipment is that of the C. & N. W. and C. M. & St. P., on four of the trains; there are eight trains, four of them are ours. There are four trains up, Nestoria to Calumet

each day. There are two big interstate trains from Calumet 1547 through Nestoria, about two hours apart, and return each day.

These are made up of sleepers, diners and baggage cars, and are the heaviest trains on our line, running between Calumet and Chicago. The heavy locomotives I spoke of yesterday are in part,

used in drawing those interstate trains. They do both an inter and intra state business. A Marquette sleeper is added to the C. & N. W. train to Chicago at Negaunee. For our own four trains over the Mineral Range we neither get or give a bonus or rent. The Mineral Range operates no trains of its own from Houghton to Calumet. The practice to permit the Mineral Range to receive all the fares is true of our trains as well as those of the C. & N. W. and C. M. & St. P. The plaintiff owns a controlling interest in the stock of the Mineral Range, its books and accounts are kept in plaintiff's office and plain-

tiff's officers are its officers.

The Mackinaw Transportation Co. property is included in the inventory. The net cost of operating the Mackinaw Trans. Co. is divided between the three operating companies; our proportion of the net loss is charged to freight, because the freight business furnishes none of the revenue. There is a revenue to the M. T. Co. from passenger service. I have given our passenger income no credit for any amount due to net earnings of the M. T. Co. in the passenger business. They charge for carrying passengers across the Straits. Its only income is for passengers, baggage, mail and express and there is no revenue for freight transported on through rates. The passenger earnings are used to reduce the loss or net cost of operation in both passenger and freight by the accountant of the M. T. Co. He reports the proportion of net loss that we are called upon to pay. Plaintiff's interest in the M. T. Co. is a stock ownership. Our trains

run onto the ferry and are carried to Mackinaw City with
1548 passengers in it, and vice versa. The M. T. Co. as a whole
operates without profit. There is no direct charge to the owning companies on account of freight transportation. The net expenses of operation are ascertained by a deduction of revenues from
passengers and the small amount of local freight, mail and express
and then divided among the three owning companies on the freight

over the Straits.

Our passenger cars are run across there for the convenience and benefit of all concerned. We can transfer passengers to the other two roads in our cars; it would be more difficult to transport the cars of the Michigan Central and G. R. & I. over to our line; i. e. a transfer can be made better by transferring cars of the one line to the two, rather than by reversing the situation. We pay nothing for the carriage of our cars across the Straits but they are used for the convenience of the passengers travelling between the three roads making one transfer of passengers do for two. The division of operating expenses is based on freight without taking into consideration the carriage of passenger cars at all, and the passengers are taken into consideration only by way of credit or deduction from the general operating expenses of the ferries. The South Shore pays between 30% and 40% of the expenses of the Mackinaw Trans. Co. I believe prior to 1913 the loss was in part assigned to passenger business.

In separating the mail and express portion of the expenses, my method was to apply 10.78% to the total expense assigned to passenger as representing the cost of that business and as agreed to by stipulation. This percentage was fixed by Mr. Thompson who divided

the accounts for 1912 and this percentage was taken from his results for 1912 and Mr. Parker's for 1913. I made no modification for the heavier equipment which later came into use, the effect of

which was reserved in the stipulation. I make no separation of sleeper and diner business or expenses, except to set off to sleeper and diner business the directly charged costs; that separation is required by the I. C. C. classification. There is a margin of profit in the sleepers, and in the diners a loss; that takes into account no cost of maintenance, wages of trainmen, coal used, track maintenance or things of that character, but simply the costs incident to the operation and management of the sleeping and dining cars themselves. My charges to sleeper and diner business include no part of the hautage cost or anything of that character and no use of property except, the cars themselves and the supplies used in them and directly

charged to that service.

In the property divisions there was no deduction from property values on account of the portion of the train used in mail and express service. The whole property was assigned to the passenger business. Pltf.'s Exs. 204, p. 15 and 205, (pp. 14-15) show the mile-ages made in sleepers for 1916 and 1917 respectively. In 1917 the number of intrastate passenger miles was 23,630,061, while the number of intrastate passenger miles in sleepers was 2,147,589, - %. The intrastate passenger miles given do not include those on the Mineral Range and it was not the intention that the sleeper figure should: I think it does not. In 1917 the interstate passenger miles in Michigan were 9,806,277 and in sleepers 3,539,818, approximately 36%. It was not our intention to include the mileage on the Mineral Range It may have been done but I think not. I am not posi-In 1917 the total passenger miles in Michigan was 33,436,338 and the total in sleepers, 5,687,407. Approximately 17%.

The trend of the total intrastate passenger miles in the past few years has been upward and in interstate downward; the percentage of intrastate to total being 1914, 64.69%; 1915,

70.29%, 1916, 70.80%, 1917, 70.67%. The greater part of the common passenger expenses for 1917 were divided 70+% to intrastate and the remainder to interstate. What we term sleeper and diner expenses, I mean the directly charged expenses, are not buried in the operating expenses they are set out. There has been set off by me to sleeper and diner no expense for train haulage, coal, time of train men, etc., and if there is such an item chargeable to sleeper and diner it is still included in our passenger expenses, and if there is now divided on the ratio of about 70% intrastate and 30% interstate, notwithstanding the figures given which represent the ratio of use of sleepers and diners by interstate and intrastate passengersthose are the figures of use by those passengers.

1551 DELF.

Cross-examination:

For 1917 about 90% of the plaintiff's passenger expenses were divided between inter and intrastate passenger business on the passenger mile basis; the ratio included all passengers and specifically those travelling on cash fares. Accounts 373, Station Employees and 376 Station Supplies and Expenses, were assigned on the ratio of intrastate passengers to the total number of passengers travelling in Michigan, including those travelling on cash fares. I have made no deduction for those travelling on cash fares made no investigation to find the proportions interstate and intrastate, and can give no ap-The large number of soldiers carried during 1914 proximation. were charged one cent per mile, which reduced the average rate per mile. The valuation expenses for the Federal appraisal appear under general expenses. This expense will be temporary while the records and maps produced will be permanent records. We charge no part of it to capital account. I cannot give you the operating ratio for the Western Division and have made no computations or figures looking towards separating that division. I could not say whether operating expenses there would closely approximate those of the portion of the line outside the State. I eliminated as an item of the general law expense, the expenses incident to this case. excludes no part of the time or salary of myself, Mr. Caderette or Mr. Eldredge, though Caderette's salary for a part of the period was charged to the case. The practice has been that the time of regular employees spent on this case is not charged to it. The only exceptions are Messrs, Caderette and Tracy. The expenses have not been increased by the wages of the clerical force.

1552 Redirect examination:

Plaintiff has not paid interest upon the \$15,000,000 of bonds held

by the C. P. R. for many years. It has been unable to do so.

If we took into consideration the mileage of light locomotives it would reduce our 1916 M. R. T. M. ratio about .49% from 44.63% passenger to 44.14% passenger, and our 1917 ratio .5% from 42.21% to 41.63%. For 1913 and previously we had no exact figures of the time of road locomotives in switching operations. We had to obtain those figures by approximation. The requirements of the I. C. C. then required that only the switching over an hour should be taken into account. In 1915 that was changed to require the entire switching time. Since June 30, 1914, our statistics show the time of each locomotive spent in switching at stations. To ascertain the ratio of switching miles in 1914 we took the same proportion of the 1914 train miles that the switching miles in 1916 bore to the train miles. We get no revenue from passengers who occupy the cars or cross the Mackinaw Trans. Co. ferry for that portion of the trip and we pay nothing for carrying the cars across. The Mackinaw Trans. Co. pays nothing for having our cars to accom-odate the passengers. The rate

is the same over the ferry whether the passenger is in our car or not. The use of our cars is simply an accom-odation to the travelling public, saving trouble in getting on and off of the cars and boats. Mail and express revenues are not separated by accounts to inter and intrastate. Those revenues were divided in relation of the passenger revenue inter and intra. So far as operating expenses and revenues are concerned we have eliminated the mail and express. Only the directly assignable expenses of sleepers and diners are eliminated from the passenger expenses.

(Exhibit 210 offered in evidence.)

1553 ARTHUR E. DELF recalled.

Direct examination.

By Mr. Tracy:

I made the computations on the first sheet of Pltf.'s Exs. 201a-201c. to assigned the property between passenger and freight and intra an i inter state. In general the method used is the same as that in assigning the 1917 property in Pltf.'s Ex. 201, though the statistics used were those of the particular year. The additions shown in these exhibits less retirements do not agree with the figures shown in our reports of additions and betterments to the State and I. C. C., as those reports are not of values but of investments and the net charge in investment is reported. These sheets show retirements from the valuation of 1913 and additions to the values of 1913 and each succeeding year. In the case of the replacement of a bridge in 1914, the exhibit would take the old bridge out at the Master's value and add the cost of the new bridge. In the reported additions and betterments account the addition would be the cost of the new bridge, but the retirement would be the original cost of the structure taken out if known and if not known, an estimated cost of the old bridge new. We would retire from our accounts exactly the amounts charged in for the structure if it appeared there—the original cost if we had it. Our ledger account shows no depreciation and old buildings stand in our property account at the original cost until demolished or replaced. For the very old structures we would not have original cost and in that event we would have to estimate the amount to retiro, The former rule, before the classification of 1915, was that the difference between the new structure in value and the old structure replaced, constituted the charge to additions and betterments.

Exs. 335-336 are blank books furnished the section foremen 1554 in which to keep a record of the work done and material used on track of various classes. Ex. 335 was for their labor and to make a distribution of it to the different classes of work; Ex. 336 was to keep track of the material and make a similar distribution. They are required to enter each man's time and make the distribution of it to services daily. The time was also distributed as to the character of work performed, whether putting in rails, ties or bridges, laying in track, or putting in other track; it is entered under the

various primary accounts. In addition he designates whether it is on exclusive freight or on exclusive passenger track. I have examined many of these reports and found them uniformly correct as far as could be ascertained. Ex. 336 is a monthly record showing material on hand on the first of the month, the amount received and applied during the month to the different classes of services and

under the various primary accounts.

I do not run across the instance referred to by Mr. Hillman in Section 34, but I found cases where the foreman had entered in the first column provided for freight, passenger and common the amount on exclusive freight tracks, and possibly in Sec. 34, he had entered the balance in the next column which are passenger tracks. It should have been entered in the third column "Common tracks." When those accounts came in for distribution an experienced man checked the labor with the material and he can determine whether an error of that kind is made and correct the error. It is evident those corrections were made as the total amount carried forward to final distribution for all sections for exclusive passenger in "Other track material" of the line is only \$450 and the error stated by Hillman was \$1528.54, and accrued in "Other track material." Including roadway and maintenance, ties, other track material and

track laying and surfacing, the exclusive passenger allocations
were but \$793 for the year. I have had careful oversight
during the year 1917 of the way these reports were received
and distribution made. I believe that except for the two errors of
under \$1,000 to which I called attention in my direct examination,
the reports as corrected carefully show the expenses on exclusive
track in 1917. The errors spoken of are where the blue print shows
two tracks as common which should have been shown as exclusive

freight.

Upon investigation I find that the mileage made by passengers on the Mineral Range are not included in Pltf.'s Exs. 204 and 205, relating to travelling in sleeping cars. In my exhibits I have not included the passenger miles or passenger car miles on the Mineral Range. In instances locomotive miles and car miles have been included for special purposes, e. g. separation of mileage of locomotives or cars to states to get the service in states. I have not included the Mineral Range, aside from the locomotive and car miles for a particular purpose, in my computation beyond including the operating expenses, of our trains over the Mineral Range and locomotive and car repairs.

The account "Superintendence" under "Traffic expenses" I divided between inter and intra, not as overhead to the other expenses of the group as Hillman did, but on the inter and intra state passenger miles. I do not think the overhead basis correct as the item "Outside agencies" is but 7.97% intrastate and the outside agencies which are 92% + interstate are not controlled by our general passenger agent, but by the general passenger agents of the other companies representing us. Therefore outside agencies should not come into the overhead to determine the distribution between interstate and intrastate. The general passenger agent, superintend

passenger traffic generally, issues tariffs and tickets and obtains reports of traffic. Under Traffic account, 351, the classification reads:

"This shall include: Pay of officers directly in charge of or engaged in supervising the procurement of traffic, and the preparation and distribution of tariffs, division sheets, and classifications."

The general passenger agent also arranges for local excursions and special trains which are for the greater part intra-state. Pltf.'s Ex. 220 is a statement of plaintiff for Michigan showing its total operations and those of the freight and passenger business, together with the net income derived therefrom before and after deducting the estimated passenger loss and the rate of return of each class of plaintiff's business, based on the valuation of 1917, Pltf.'s Ex. 201 ,and on the Master's valuation of 1913. The exhibit shows the Master's valuation for each of the four years and the last page shows an average of the four years. This is correctly made up by me. (Pltf.'s Ex. 220 offered in evidence.) Pltf.'s Ex. 221 is a computation of the rate of return on property values shown in Pltf.'s Exs. 201, 201a-201c, and shows the intrastate value for each year, 1914, 1915, 1916-1917, the net intrastate passenger income and rate of return both before and after deducting the estimated loss. This exhibit is made from figures already in the record, the net returns being taken from plaintiff's Exs. 206, 207, 208 and 209.

Cross-examination.

By Mr. Wykes:

Pltf.'s Exs. 220, and 221, show the entire intrastate property and the return on the passenger property. I cannot combine to give you the return on the total intrastate property. We have made no figures separating freight property or revenue. It is impossible for

the court from my figures to ascertain that.

Pltf.'s Ex. 220 relates to each year 1914-1917 and to the Michigan passenger property as a whole. In each instances results were obtained without deduction for expenses on the Mineral Range. In each instance there is no deduction of facilities or expenses by reason of property located in Michigan which serves the entire line, such as shops and water stations. So far as those things should go out of Michigan, if they should go out, the incident expenses are included in the figures entering into my final results.

My results are entirely predicated, so far as common expenses, not divided on some near basis, are concerned, upon the division of common expenses between passenger and freight upon the revenue train miles in Pltf.'s Exs. 206-209. I have made no deduction for sleeper and diner expenses except to carry as a separate item the direct costs incident to their operation. I did not even take out the direct costs.

In Pltf.'s Ex. 221, I show a slight return for 1914 and 1916 and no net return for 1915 and 1917 in intrastate passenger operations, obtained after the deduction of a loss equal to the difference between the rate now being charged and the statutory rate on the business applying to the particular year. That is a straight mathematical

computation applying the two cent rate to the passenger miles. The computation is based on actual travel in each of the years with no allowance whatever for increases in traffic due to stimulation of business. The expenses of plaintiff's trains over the Mineral Range are included in plaintiff's operations with nothing set off to the Mineral Range. Our passenger miles included those of the Mineral Range previous to October, 1912, back to 1910. The item Traffic is one of the group accounts and includes outside agencies, which was allocated by all parties on the basis of an investigation by Mr.

Heiss, on which he separated between inter and intra services. 1558 We had made the allocation between services ourselves. The official classification provides that outside agencies shall include:

"This account shall include the pay, and the office, travelling, and other expenses of general, commercial, city, and district agents and other- soliciting traffic, the employees of their offices, and traveling agents and solicitors located on or off the line of the carrier's road. City ticket and freight offices, shall be treated as outside agencies; the pay and expenses of the employees therein and the expenses of such offices shall be charged to this account. Commissions for services pertaining to either freight or passenger business, except commissions paid in lieu of salaries to carrier's agents located upon the carrier's own line shall be included in this account."

The supervision of operations under the account "Outside agencies"

is directed by the general passenger agent. We have no superintendent of traffic. The expense- of the general passenger agent are in part found under the item 351, Superintendence. A portion of the item, "Outside Operations," comes in through commissions paid to agents of other lines who have sold tickets over our line. On those agencies the entire supervision was given by the officer of some other company. If the G. R. & I. agent routed passengers over our line and we paid him for it, he was superintended in that operation by G. R. & I. officials. If one of our agents routed passengers over the G. R. & I. there might be a reciprocal arrangement by which our agent would get a percentage on the ticket by personal arrangement with the G. R. & I.

"Q. If the G. R. & I. is extending supervision to that service that they know nothing about, it is done without the consent of the . 1559 general officers, is it not?

A. That I don't know; I don't know what the arrangement

is; I have nothing to do with that,"

We get varied rates on excursions on our line there being no fixed rates. There may be a general tariff filed with the I. C. C. or State Commission for week end excursions. The rates for that run considerably below our usual rate. That covers round trip transportation. I have not those rates in mind, I could not tell them. I have never made any computation to find out how many passengers per year we get on that sort of business. I have never made any computation to see whether it is profitable or not. run those excursions every week end. In addition there are many special excursions between points on our line and to Detroit and other connections. There is a considerable volume of the excursion

business. I do not know whether we would get the business or not if we did not make the special rate. It is made to stimulate the business in cases where there are special fairs like the county fair at Marquette, to get people to go to the County fair. We make special rates in combination with other railroads that go as far as Detroit. We go to Detroit twice a year. I do not think we make any special excursion rates beyond Cleveland. I know of none to eastern points except possibly once a year at St. Anne de Beau Pre, north of Quebec. That business is carried on to get the business in volume. In many instances the special rates given do stimulate business and we necessarily get more business on account of it. When there is a special occasion that the people want to go to and we run a special train and give a lower rate, it is an inducement and brings the people. A low rate is an inducement to the people to take a journey which they would not otherwise take in bulk.

The million miles of state troops carried in 1914 at 1¢ per 1560 mile fixed by statute entered into the accounts in the amount received. The effect is tomake the estimated loss as we have figured it. There would be another cent a mile on that travel. Exs. 335-336 were used by me to find and attribute \$56,123 to the expense of maintenance of exclusive freight tracks in 1917 and \$1.045 to exclusive passenger and a certain amount to common maintenance. I have not that amount. The results are taken from all sources, whether they come through section books or from other sources. The amounts reported in Defts.' Exs. 335-335 would not aggregate the amounts spent in maintenance of track separated to the various There is a way of checking the books for the particular items we have referred to.

"Q. In the book entitled "Distribution of Track Labor," I am unable to find anything in it which relates to any division between freight, passenger, and common, or "neither," which is the head of the fourth column, which relates to any distribution between services.

A. Just what do you mean by "Services," the primary accounts.

Q. Between freight, passenger, common and neither, between those services, for the purpose of that question. Those columns you tell the man not to fill out, but you tell him him at the bottom of the sheet in the middle of a book of perhaps ten pages "In front of the time entered daily for work done on exclusive freight or passenger tracks, write the letter 'F' for freight, or 'P' for passenger.' the sum total of the directions contained in that book, is it not, Mr. Delf?

A. The instructions are in the front.

1561 Q. Find in the instructions then where you direct him in any detail to divide between services. I have not been able to find it.

A. "Distribution of labor (Pages 2 and 3) Enter hours worked on each kind of work under proper heading. The total number of hours for day for all employees will be same as total shown on time roll.

That is the second paragraph on the first page, on the cover. Dis-

tribution of labor, pages 2 and 3.

O. Well, now, that relates, does it not, to the kind of work which is set down on the side of the sheet, and not to your columns of distribution at all.

A. As a matter of fact it relates to the whole thing.

Q. It relates to anything that the men might be bright enough to find in that book, doesn't it?

A. And they do; they designate freight or passenger as is intended

by those instructions.

Q. And the check that you say was made of this was a check made to discover errors apparent on the face of it?

A. Yes, to check the labor and material.

Q. If a man had been guilty of a mistake in judgment, or had not understood the instructions, and had put his figures in the wrong column here on the right of the page, you had nothing in your office that would permit you to correct that error, had you?

A. Yes, the fact that distribution of labor showed that there was no labor in the passenger item, and there was material under the passenger, would indicate that there had been an error in the distribution

of that material.

1562 Q. When a man requisitions his material, he requisitions it for the passenger service, freight of common?

A. He requisitions it for general service.

Q. If he requisitioned it for general service and it were assigned out to general service, what record have you in your office to permit you to determine whether he had correctly entered it under these items into which general service would be divided?

A. There are only three services, freight, passenger and common. Q. And "neither," whatever that is.

A. If he didn't use it for either service it would be still on hand,

as shown in the red book.

Q. What I want to know is, when it was assigned to general service, how could you check to see whether he was correct in reporting its use for a particular service?

A. If you will refer to the distribution book, and the instructions in the distribution book, they are clear as to how the is to report the material as to the freight, passenger or common service in the use of

material.

Q. In other words, you say they are clear because it says that: "Particular care should be taken to enter in the proper columns material used on exclusive freight, exclusive passenger, or common tracks."

A. Yes.
Q. But you furnished the men nothing else for the purpose of telling him what is a freight, or what is a passenger, or what is a common track, but you did furnish him with this blue print book that has gone in as an exhibit, that I insisted was misleading?

1563 A. We furnish him the blue print book, and if you will refer to the white book, at the bottom of page 4, where he makes the distribution of time, you will see in bold type: "In front of the time entered daily for work done on exclusive freight or passenger tracks, write the letter 'F' for Freight, or 'P' for passenger.

If you will refer to the white book, Mr. Wykes, you will find

Q. You mean that notation at the bottom?

Q. I read that, I called your attention to it a few minutes ago, that F and P?

 A. Yes.
 Q. In other words, instructing your man not to put these in appropriate columns after you told him to in the other book, but to put the words "and P before it?

A. That is so that this further distribution can be made in the

general office.

Q. You say you made a check in the office of these books, do you know how many errors they discovered?

A. No, I do not. Q. The checking made in your office or in the engineer's office?

A. It is in the engineer's office under our supervision.

Q. And if that 34 was found and corrected as you think it was, it was not called to your attention?

A. No, it was not. It must have been corrected as it was not car-

ried into the final distribution.

Q. Or, Mr. Delf, there must have been an offsetting error

1564-5 somewhere else that in effect corrected it?

A. I don't see how there could be an offsetting error to correct an excessive assignment to the exclusive passenger. It would necessitate a credit to do that."

The retirements and additions in Pltf.'s Exs. 201a, b and c, are based partly on cost but do not follow the costs or our books or reports completely. In retirements we have cut out the Master's value at his upit price, thus excluding the item that he included. charges in our books under "Road" or "Additions and Betterments" are charges to investment and not to value, would represent the charge in our property accounts and would not be the figures in these exhibits. In the retirement of an old bridge, the charge to operating expenses would be the same as the credit to the old structure, which is either the ledger value or the estimated value less salvage.

Redirect examination.

If there is depreciation reserve in our books a portion of the retirement would be charged to that account and the balance to operating expenses. We carry no depreciation reserve except on equipment and ore docks.

1566 R. C. Young, recalled before the Court Nov. —, 1917, by plaintiff.

Direct examination.

By Mr. Tracy:

I have examined Riggs' and Hansel's appraisals and the Master's report, and find no price fixed as of 1913 except Schedule 6, Ties, the prices used being those of 1911 and 1912. The proper comparison to show effect of increased prices is between the prices of 1911-1912 and those of 1917. Mr. Caderette conferred with me regar. }ing unit prices. I am familiar with those he used. The price for earth grading is low-lower than you would expect it to be done for in 1917. I did considerable construction work in 1917 but let no grading contracts; on one proposition, two miles of grading, I obtained figures from three contractors but they were so high I advised against acceptance. They were higher than the prices here used. Prices have increased more than the differences between the previous appraisal and the 1917 prices. Labor is a principal element of grading and the increase in labor 1911-1912 to 1917 has been approximately 50%; decreased efficiency makes the increases much more; we are not able to get as efficient men as in 1912. The prices used for rock and for clearing and grubbing are all low, in my judgment. In the 40¢ for grading, I figured shrinkage to be added to the yardage and that, where the work is not steam shovel, over-haul should be added. I do not think the 7.5% added by Riggs for overhaul, etc. ought to be included. I added 10% for shrinkage, drainage, road crossings, etc. The tie prices are too low to cover an average of 1917; they are made possible because of many settlers along the road where ties can be purchased in small quantities. Mr. Caderette's figures included no charge for handling. Tie prices went up rapidly after November 1916. 9¢ would be proper to take the ties from along the right of way to the material vard or deliver

them to the track laying gang. That figure based upon cost would be: loading 4.5¢, hauling 3.78¢, loading 1¢, total 9.28¢. The prices we paid for rail in 1917 were rather more 1567 than those used by Caderette. Upon whether the increases in rail price is temporary or permanent, we have decided not to postpone our work to await lower prices. I think they won't be any lower for several years. Rail prices have been uniform for the last 15 years; other steel products have fluctuated but gradually raised. track fastenings, our angle bars have not cost quite as much as the figure he used. Track laying includes taking the material from the yards, laying it on the finished grade and spiking and lining it up. Surfacing is the taking of the material from the shoulders and sides of the track and putting it into shape so the track can be used without danger to trains and material until the ballasting be-I do not think the track laying and surfacing could be done in 1917 for \$900 a mile. It always cost me about \$764 a mile and the increase in labor and train service is 50%, under present condi-This is largely a labor item except the train service. do not hope for any lower labor prices for some years. I think next year will be worse than last. Track laying machinery does not decrease the cost but makes it a little quicker. The 1917 unit price for ballast is made up of: Gravel in pit, 2¢; loading, 12.59¢; stripping pit, 2.25¢; pit tracks, 2.25¢; transportation, 20.5¢; cutting out between ties, 3¢; raising and tamping, 23.74¢; fixed charges on equipment, 6.45¢; total, 72 78¢ plus contractor's profit of 10%, equals 80.06¢. I think this price fair and conservative. I think the sand balla t price too low. The only reason why cinders should be lower than gravel is because of the cheaper loading. I think Caderette's price fair for side tracks but not enough for mining tracks 1568 included in his side tracks schedule. I know the character of construction and of the rails, ties and side tracks of the plaintiff. The cost of labor and material has increased since 1912 and 1913 very materially.

Cross-examination.

By Mr. Groesbeck:

The price of rail, 1900-1916, was \$28 a ton; in 1917 it was quoted at \$38 for Bessemer and \$40 for open hearth. The price advanced very rapidly on all classes of material in 1917, I presume due to the enormous demands for shell steel and export demand. I think the steel and other track material prices will remain where they are for sometime. We built no bridges and bought no bridge material since the winter of 1915-1916. Most roads obtain a price from a bridge company to build the bridge complete, though some do their own erecting. The shop plans are furnished by the bridge company but the original plans are furnished by the railroad. They are not standard specifications; every bridge is a proposition by itself—designed by itself.

When you make a cut with a steam shovel, all but large stumps are grubbed out with the shovel. On this line, St. Ignace to Marquette, there would be no steam shovel work; there is nothing east of Marquette sufficiently heavy to pay to transport a steam shovel over land to get it there. Where the embankments are over 2.5 feet high no grubbing would be necessary, but where under that, grubbing would be paid for. At present it would cost more to get the grubbing done than the price I approved. Out of 52.8, 100 foot stations in a mile, 40 would have to be grubbed. The price during 1917 would be \$18, and in 1912 about \$12 a station. The figures I approved are all based on the theory of reproduction new and on

what I think 1917 costs would be.

1569 EDWARD S. BICE, a witness for plaintiff, produced before the Court on Nov. —, 1917.

Direct examination.

By Mr. Eldredge:

I am vice president of the First National Bank of Marquette having been connected with it 26 years in various capacities. The president resides in New York and I am in practical charge. I know the interest rate prevalent in the Upper Peninsula and along plaintiff's line, by having discounted paper and by making collections for other banks. We have loaned money at most of the principal places along the line. The rate of interest prevalent on secured loans is 7% in small transactions, and 6% in the larger. The 6% rate pre-

dominates. Of our local loans, 15% would be at 7% and 85% at 6%. This rate has prevailed ever since I have been connected with the bank.

Cross-examination.

By Mr. Carr:

On savings deposits we pay 3%, which is the customary rate with banks of the Upper Peninsula. That money is subject to taxation to its owner. The Marquette bond interest rate is 4% and 4.5%. There are no recent issues. The interest on local loans has remained stationary. Outside loans that we purchase in banking centers it has increased during the last 1.5 years due to the extraordinary conditions in the money market. Money rates for 2 or 3 years prior to the middle of 1915 were at a low ebb. Railroad obligations I have been familiar with, are from 4% to 6%, depending on the issue. The average rate of interest on railroad bonds in 1895 was approximately 4.69%. Prior to the commencement of the war, interest on railroad bonds had decreased to less than 4%.

Redirect examination:

The rate of interest on a railroad bond depends upon 1570 the view of the public with regard to that particular railroad. I had in mind the rate of interest that the bonds bore. The rate of return would be higher—considerably so, at present.

Recross-examination:

4% bonds of the Pennsylvania & New York Central sold above par in years gone by. I think 4% bonds of the New York Central are along 94 or 95. I have not seen a recent quotation. These bonds are subject to taxation in the hands of the owner. In this State bonds of 2 or 3 years ago bore 4% interest. The first government loan was floated at 3.5%, the second at 4%. I am familiar with the Michigan law permitting the payment of a small specific tax on a Michigan bond or mortgage in lieu of other taxes. The prevalent rate of interest on mortgage securities along the line of the South Shore in Michigan is 6%.

1571 Charles F. Loweth, plaintiff's witness recalled before the Court Nov. 26, 1917.

Direct examination.

By Mr. Tracy:

Qualifications given on previous appearance.

I testified previously in this case. Mr. Caderette conferred with me this summer to obtain unit prices to apply to 1917 values; I have since examined his unit prices in detail; I advised him at the time that I thought the prices were conservatively low; my subse-

quent examination has confirmed that. Since previously testifying I have verified the unit prices I then gave to be applied to items This by the experience of 5 years since the previous under grading. trial of this case and by price agreed upon between the C. & N. W. and the C. M. & St. P. for the transfer to the latter of a joint interest in a large number of mining spurs in the Upper Peninsula in the Crystal Falls and Iron River Districts. Agreements for that purchase were made early in 1915 and appraisals were made shortly before. The property was gone over by the engineering departments of both companies and the quantities ascertained. Prices fair and reasonable in the judgment of the engineering departments of both companies, were then applied. The prices for earth work were 30¢ and 33¢. The tracks represented different kinds of construction, were long and short and the work was both light and heavy. The unit prices on moving rock and clearing and grubbing were relatively the same to the prices applied by the Master, as the price for earth work and to which I previously testified. They were all higher. Values and unit prices were practically the same in 1913, 1914 and 1915. I believe the prices paid the C. & N. W. were fair to our Company as a purchaser. The grading prices in 1917 would be materially increased due to increased cost of labor, and other elements. The increase for earth work to 40¢ a yard for 1917

1572 would be fully justified as would the increase for rock, and clearing and grubbing. After study of the reason for increased labor costs and the probability of their being permanent: extending over many years there has been a decided and gradual increase in labor costs and very few instances of a general reduction; so far as organized labor goes, I think there has been a constantly ascending rate; unskilled labor is becoming more and more organized, so I think the same rule will apply to it: I think the tendency will be materially increased in future because of legislative recognition of the protection of labor; I think those tendencies are independent of abnormal conditions due to the war, that the war will aggravate the other tendencies and make less probable a reduction of present labor rates. The emmigrants will not come over in the future as in the past, as there will be more work and higher rates at home and less inducement to come to this country. I do not expect labor as entering into a railroad or its materials, to be materially lowered in the near future. We are not deferring any work on the score of high cost of labor, hoping it will be reduced. recent investigation I made to determine fair average increases in the cost of structural steel for bridges in 1916 as compared with 1914, shows an increase of 69%. That was a fair average for the calendar year 1916. The difference to 1917 would be materially greater; Mr. Caderette's price of 7¢ per pound for steel in bridges in place, in 1917 as compared with 4¢ per pound adopted by the Master as of 1912 or 1913 is too low. The increase of \$6 per thousand for timber in place in bridges in 1917 is less than should properly have been made. I base this on the increased cost of labor and lumber in 1917 over 1912. Increasing cost of piling in 1917 to 50¢ over the Master's 40¢ is ver; conservative. I have been over

plaintiff's road a number of times; made a special trip over it last June. I found it in very good condition and found the few bridges I examined in a very good condition of repair, also 1573 the rails, ties and ballast. They were in excellent repair for a railroad of that class. The unit price of \$41.25 per ton for rail delivered along the bank ready to be placed in track, is too low, as not enough is added for handling. After study of the question I do not think there will ever be a return to the prices for steel that prevailed prior to the war. There may be lower prices than now prevail for some steel products, as some are very high. I doubt if there will be a recession in price for many years, if ever. if there will ever be any reduction in the cost of steel rails. Steel rails have been fixed arbitrarily for 16 years past and before the war there was much demand by steel manufacturers for an increase. It was brought about by the increased cost of steel products generally and by the railroad's demand for better quality of rail. tendency of this demand for better rail was to increase the cost materially. For this reason I believe there will be no reduction in the cost of steel rails. I think the average cost to our road of track fastenings for 1917 slightly in excess of Mr. Caderette's price. Caderette's 1917 prices for ballast are reasonable and conservative. I do not think track laying and surfacing could be done for \$900 I think \$1200 a conservative estimate. We have used track laying machines on all classes of work, and my price would be based upon the cost so done. In reconstructing the plaintiff's railroad it would be impractical to lay the track by hand as it would be cheaper and take less time by machine. There is very little grading on this railroad which it would be economical to do by steam shovel, and there is much of it where a steam shovel could not be used at all. A steam shovel is heavy and cumbersome, cannot easily be hauled over country roads and does not pay unless the work is of such volume as to justify the cost of installing it. It is commercially impractical to construct your grade as you go along, moving the steam shovel on the track. That process would be very slow. It would be difficult to get steam shovels onto the South Shore and much of the work is of a character that it could

Cross-examination.

not be done with steam shovel.

By Mr. Groesbeck:

Under certain circumstances it would be economical to transport a steam shovel over country roads. The work is sometimes done by first making a narrow cut to lay the tracks through a particular section, after which the steam shovels are brought in to move the earth and widen the cut, but that is not the customary way, nor is it practical railroading. If you had a location, such as that around Wetmore or Munising Junction, where there was five miles with 60,000 yar's of earth work per mile, it might be more economical to put in a steam shovel and when you got through take it to another place of like character and repeat the operation if the other places were

such that a steam shovel could be economically and profitably em-

ployed.

This is providing the work where the shovel was first engaged could be finished in advance of the other work. A steam shovel will move a large amount of earth more quickly and cheaply than other methods. In my figures I have proceeded upon the cost of production new theory, assuming that the plaintiff's railroad would be entirely wiped out and the condition as it would be if the railroad was removed at this time. This would leave the country in natural condition with no grading or roadbed. I take away the South Shore leaving other railroads and highways as they are. I do not take into consideration the original cost, nor do I know it.

It is doubtless true that the steel mills and manufacturers of locomotives have been increasing their capacity and output in the past two or three years, this being due to the use of the output as instruments of war. This is increasing and when the war ends it will be found that steel plants and like industries have increased their capacity to a very large extent. In my judgment when the demand for war materials ceases, the demand for other classes of materials will increase. I understand that the capacity to manufacture steel products and the efficiency of the plants, both in this country and in Europe, has been very largely increased. Laying track by machine is a common practice, and that is the proper way when there is any quantity of work. Such a machine costs about \$3,000; properly mounted and supplied, under average conditions it will lay a mile or more of track a day; occasional records show two miles a day. In building a railroad the first thing is to make a survey, then acquire the right of way, then clear, build the sub-grade, ditch and put in bridges and culverts, build telegraph and telephone lines, then lay the ties, tracks and ballast.

Prices were about the same in 1911, 1912 and 1913, a little cheaper in 1914 and about the same in 1915; in the spring of 1916 there was a raise of 10 to 20%. Compared with the first time I went over plaintiff's railroad, its present condition has changed for the better. It has better ballast, its right of way and tracks are in better shape, and it is evident that the property has been very well

maintained at least. There is no doubt that the tonnage being moved in a train is today greater than a few years ago. The tracks purchased from the C. M. & St. P. by the C. & N. W., was a half interest in mining spurs already built and operated. We did not get quite the same rights as the C. &. N. W. as they reserved the right of oper-1576 ating over them in certain cases and doing our switching. We acquired very nearly the equivalent of a joint ownership. was the equivalent for all practical purposes and in that deal we used the prices I have stated. When I stated steel bridges went up 69% in 1916, I referred to the entire calendar year.

Redirect examination.

By Mr. Tracy:

If the engineering on roadway and structures on this line could have been done in 1913 for \$255,000. I think that a conservatively increased cost in 1917 would be 20%. I have in mind the cost of engineer's services and I perhaps under-estimated the small amount of common labor. It would be 25% or more as against Mr. Caderette's 30%. The work of a preliminary survey for construction of a line following the plaintiff's present line could not be done satisfactory to me for \$100 a mile, and I do not see how it could contract for such work, as that requires skill, time and judgment.

My estimate of the cost of track laying and surfacing was derived from experience, both before I testified previously, and in work done since and in assembling information as to the cost on various railroads for the Federal appraisal. I know of no case where any rail-road has reported track laying and surfacing as low as \$900. Mr. Prouty conceded the cost for the Texas Midland, a light, poorly constructed road, should be \$900 as a minimum. A steam shovel could

be used on the plaintiff's railroad but generally would not.

1577 Evidence on the Part of the Defense in Open Court.

C. A. PARKER, recalled before the Court as a witness for Defendant, on Nov. 26, 1917.

Direct examination.

By Mr. Wykes:

(Qualifications set out in previous testimony.)

I previously testified in this case. The evidence of the various witnesses as to land values has been compiled by me in Defts.' Ex. 301, which places the testimony and a reference to the record page opposite each section of land. The exhibit is self explanatory.

I believe I have brought together all the testimony relating to

country land values.

In Defts.' Ex. 302, is a computation of testimony regarding the value of plaintiff's land located to counties, showing the area, the witness whose testimony is accepted for the purpose of this computation, the record page, the price per unit of value whether by square foot, acre or otherwise. It is noted as to whether it is in railroad or non-railroad use, and those computations are extended to classify it as to freight and passenger, common freight and passenger, ore lands and the total value. This exhibit is in same form as plaintiff's exhibit before the Master and contains the same areas though somewhat differently divided. I have attempted to account for all lands and have applied the prices taken from the record, of the witness relied on by defendants. The property is then separated to services on the same basis as plaintiff used. This exhibit was before the Master but

has never been proven in any testimony. The final totals on Defts.' Ex. 302 represent defendants' claims. Defts.' Ex. 303 is a list of the assessed values of plaintiff's railroad 1902-1916 inclusive. The final assessed values being for 1914 and 1915, \$10,500,000.

1578 and 1916, \$11,000,000. (The reports of the plaintiff to the State Board of Assessors for 1914 to 1917 inclusive, were marked defendants' Exhibits, 1914 equals Ex. 304, 1915 equals Ex. 305, and 1916 equals Ex. 306. It is agreed between counsel that all the original reports of the plaintiff to the State Board of Assessors or

Railroad Commission may be considered in evidence.)

Defts.' Exs. 304, 305, and 306, reports for 1914, 1915 and 1916,

contain the following description regarding its real estate:

"Detailed statement of the real estate owned by the Company in Michigan on the 30th day of June, 1914, where situate and the value thereof. Then follows, description and location and the column provided for value. That portion of the Duluth, South Shore and Atlantic Railway situated in the State of Michigan as shown on page 13 of this report. The value of the following item-being taken together to make up the total value. Engineering, right of way and station grounds, real estate, grading, bridges, trestles and culverts, ties, rails, track fastenings, frogs, and switches, ballast, track laying and surfacing, fencing, crossings, cattle guards and signs, interlocking and signal apparatus, telegraph, station buildings and fixtures, shops, round houses and turn tables, water and fuel stations, warehouses, docks and wharves and miscellaneous structures, \$8,244,946.00. That is opposite the printed note Total in Michigan."

On page 11 of exhibit 304, being for the year ending June 30th, 1914, the page is headed "Personal Property" and requires an answer

to the following:

"Detailed statement of all personal property, including moneys and credits owned in the state of Michigan on the 30th day of 1579 June, 1914."

Then follows columns headed, Description and Value.

Then this is answered:

"Personal property of the Duluth, South Shore and Atlantic Railway Company situated in the State of Michigan as follows: Cash, stores and supplies, shop, machinery and tools, balance of accounts, ferries and a proportion of the total value of locomotives, passenger, freight and miscellaneous equipment, \$2,900,000.00."

Approximately the same value appears in the reports of 1915 and

1916

The report for 1914 contained the following affidavit:

"STATE OF MIGHIGAN, County of Marquette, 88:

I, the undersigned, A. B. Eldredge, president of the Duluth, South Shore and Atlantic Railway Company, on oath, do say that the foregoing return, except so far as the same attempts to give valuation of property, has been prepared under my direction from the original books, papers and records of the company; that I have carefully examined the same and declare the same to be a complete and correct statement of the business and affairs of said company in respect to each and every matter and thing therein set forth, except the valuation of property, to the best of my information and belief; and I further say that no deductions were made, before stating the gross earnings or receipts herein set forth, except those shown in the foregoing accounts; and that the accounts and figures contained in the foregoing return embrace all the financial operations of said Company during the period for which said return is made.

I do further state that this Company is now engaged in litigation with the State of Michigan or its officers, in respect to the validity of the so-called Two Cent Passenger Fare Law, and

therein the value of its property for rate making purposes, as well as the question of what property is used in railway operation, is in issue; that in said litigation the Attorney General and Railroad Commissioners allege and contend that the value of the company's property used for railroad purposes in Michigan does not exceed the sum of \$11,000,000.00.

With reference to the property in the said report described on page 9 thereof, I have no knowledge or information, or present means of acquiring information, so that I can state the value of the same, or of the separate parts thereof, except I should base my judgment on the conflicting statements of witnesses who have sworn in the litigation above referred to, and therefore I directed that a valuation be given to the said property which, taken with the property described on page 11, would approximate the valuation given by me in the verification of the bill of complaint in the litigation above referred to.

With reference to the property described on page 11, I have no personal knowledge of its value, but I believe, from the information given me by the employees of the Company, that, as a part of a going railway earning a fair return on its investment, it is worth the sum

named

In valuing the real estate described on page 10, I directed that the assessed valuation thereof be used, except in one or two instances where I had reason to believe that the assessing officers had made their valuation in error by confusing one piece of property with another. In most instances under this heading I directed that there should be included the lands which in the past have been locally as-

sessed, although I think it more than likely that the decision on the litigation above referred to may determine some of these lands to be in railway use, as also it may determine lands not to be in railway use, as also it may determine lands not to be in railway use, which have been so included in the value given.

It was my intention to arrive at a total value of the property operated by the company which should approximate the figures given by me in the verification of the bill of complaint above referred to.

It is my judgment that the value of the property of this company fixed by the State Board of Assessors for the fiscal years ending June 30th, 1912, viz. \$9,600,000.00 is for the purposes of taxation, a fair valuation, when the value fixed upon the other property of the state

for like purposes is considered, and when the return received by this company on its business is considered.

A. B. ELDREDGE. (Signed) President.

Subscribed and sworn to before me, this 17th day of September, 1914.

W. J. ELLISON, Notary Public, Marquette County, Michigan.

My commission expires Jany, 6, 1916,"

Defts.' Exs. 304, 305 and 306, contain statements of current additions and betterments. They are shown in net amounts to be:

	Total	\$65,861.98 net reduction.
1916		114,654.90 "
1915		55,516.20 reduction

The report of the company, Defts.' Ex. 306, states additions and betterments July 1, 1907, to June 30, 1917, as a net increase 1582 of \$1,376,256.82.

The plaintiff's reports to the State Board of Assessors for 1912 contained the following affidavit:

"STATE OF MICHIGAN, County of Marquette, 88:

I, the undersigned, A. B. Eldredge, President of the Duluth, South Shore & Atlantic Railway Company, on oath do say that the foregoing return has been prepared under my direction from the original books, papers and records of said company; that I have carefully examined the same and declare the same to be a complete and correct statement of the business and affairs of said Company in respect to each and every matter and thing therein set forth to the best of my knowledge, information and belief; and I further say that no deductions were made before stating the gross earnings receipe herein set forth, except those shown in the foregoing accounts; and that the accounts and figures contained in the foregoing return embrace all of the financial operations of said company during the period for which said return is made."

That is the end of the printed form, and following that in writing appears the following:

"I further state that the valuation of property, except as otherwise appearing, are my estimates of the value based upon earning capacity of the property, and that I have no other me us of personally making a valuation, and further state that I do not know the value of the lands listed as not used in operation and I believe that some of the lands so listed are in fact used for railway purposes; that this is a matter not easy to determine and is now involved as a legal question in a suit between the Railway Company and the State.

(Signed) A. B. ELDREDGE,

President.

Subscribed and sworn to before me at Marquette, Michigan, this 14th day of September, 1912.

W. J. ELLISON, Notary Public.

My commission expires January 6, 1916,"

The valuation claimed that year by the Company was: Real estate \$9,117,946; Personal, \$2,027,000. The report for 1913 contained an affidavit similar to that of 1912. The amount reported for taxation for 1915 was: Real estate \$8,244,946; Personal \$2,900,000.

Defendants' Ex. 307 (introduced in evidence) is a statement of the investment in road and equipment for Michigan, being a statement of additions and betterments by years, the first three years, 1914, 1915 and 1916, being compiled direct from the annual reports of the Railroad Company to the State Board of Assessors for those years. The fourth column of figures headed "Parker" is an assignment for the year ending June 30, 1917, which is made by me on the bases which were used in the previous years, that is, the comparable bases, namely, road miles, and that data was furnished me by Mr. Delf.

This exhibit was correctly prepared by myself. I acquired information as to additions and betterments for the entire line and assigned engineering, shop machinery, equipment, etc., to Michigan on bases used in previous years by the Company. The fifth column shows the totals for the four years. The red figure indicates a net deduction, indicating some retirement of property. Defendants' Ex. 308 shows statistics of plaintiff's passenger, ore, and freight traffic.

They are passenger and freight and separately the ore freight statistics of the D. S. S. & A. such as were available to me from 1902 down to the end of the fiscal year 1917. They show the passenger train miles and car miles, average number of cars per train mile, passengers per car mile and per train mile, all passenger

miles or the number of miles travelled by passengers, and that is subdivided into inter state and intra state by figures taken from records in this case. And under the freight statistics, shows the freight train miles, the freight car miles, average number of cars per train mile, the ton miles of freight, average ton miles per train mile, average tons per car mile, and then a subdivision of that, of the freight statistics indicating the ore business separately. These figures were compiled from the plaintiff's records except the inter and intrastate passengers one mile, which was taken from the records in this case. The statistics regarding the ore business were furnished to me by the Company. The average tons per train mile is shown to be: 1911, 241.27 tons and 1917, 348.06 tons. These are correctly

compiled by me from reports of the Company. (Exhibit 308 intro-

duced in evidence.)

Defendants' Ex. 309 is based on the train consists of various trains over plaintiff's road, and shows: first column, weight of locomotives: second column, weight of baggage, mail and express cars; third column, weight of coaches; fourth column, of diners; fifth column. of sleepers, last column, total weight of train. Train 3 and 4 is a heavy train, C. & N. W. Copper Country Express to and from Chicago. My computations show that the foreign sleepers on trains 3 and 4 and C. M. & St. P. trains 103 and 104, Chicago to Copper Country, and back, and the seepers separated from those trains and run into Marquette, for 1916, carry an average of 4.87 passenger miles per car mile. That is, all inter and intra passengers on the sleepers were less than five passengers per sleeper. These are the interstate trains to and from Chicago. The sleeper on the Soo route, Detroit to the Soo and return, 1916, 9.62 passengers and in 1917. Of the 639,967 passenger miles in the Soo route, sleepers for 1916, 564,155 or 88,15% were intrastate, that is 8,48

1585 passengers per car out of a total of 9.62 were intrastate.

Out of 686,509, passenger miles on that route in 1917,
608.526 or 88.64% were intrastate, being 9.64 intrastate passengers

out of a total of 10.87.

The same analysis for the foreign or interstate sleepers to and from the Copper Country and the Marquette on C. & N. W. trains 3 and 4 and C. M. & St. P. 103 and 104 and D. S. S. & A. trains 10 and 11 Negaunee to Marquette and C. & N. W. train 110 with Chicago sleepers the trains being essentially interstate, shows that out of a total for 1916 of 733,267 miles, 118,509 or 16.16% were intrastate. This was .79 of one passenger intrastate of a total of 4.87 passengers per car mile.

Over the same route out of a total for 1917, of 759,691 passengers, 106,763 passengers miles or 14.05% were intrastate, this being .71

passengers per car mile out of a total of 5.04.

Trains 3 and 4 and 103 and 104 which are the interstate trains to the Copper Country require pusher service up the L'Anse hill on the return trip going south and east, and No. 7, is pushed up the hill out of Marquette going west. The statistics shown on Defts.' Ex. 309 were correctly compiled by myself. Defts.' Ex. 310 prepared and correctly compiled by me, divides passengers carried in foreign sleepers between interstate and intrastate. The figures are comparable with Mr. Deff's, though his exclude the passenger miles made on the Mineral Range, while I did not. Defendants' Ex. 311 is the detail to show the number of passengers carried on the several routes and the passenger miles made in Michigan both total and intrastate and the percentage of intrastate for 1916-1917. For comparison I have inserted Deff's figures below the line in each instance. My

statistics regarding travel in sleepers were taken from the conductors' cards and the consistent difference from Delf's figures from month to month indicates that he has included the haulage in sleepers on the Mineral Range. The computations are correctly made and figures correctly set down on Defts.' Ex. 311.

Defts.' Ex. 312, shows the passengers in D. S. S. & A. sleepers as distinguished from those in foreign sleepers. This is based on Mr. Delf's figures with a deduction, based on investigation and records, on account of the Mineral Range and the figure below the line in each instance is our figure for the total passenger miles in sleepers and the intrastate. These computations were correctly made. The

latter sould be 1917, not 1916.

Defendants' Ex. 313 is a comparison of the passenger miles in sleepers with the passenger miles on plaintiff's railroad. The upper half shows the total passenger miles for 1916, being the same as Delf's, and the percentage relation of intrastate and interstate to the total; below, separately totaled, are the passenger miles in sleepers, the Soo route being 88.15% intrastate and 11.85% interstate. Out of the total passenger miles 29,683,083, the number in sleepers was 6,049,936, or 20.38%, there being 8.81% of the intrastate passengers and 48.44% of the interstate passenger miles which were made in sleepers. The percentages for 1917 are shown at the bottom and the figures on the exhibit were correctly compiled. (Ex. 313 introduced in evidence.)

Defts.' Ex. 314 shows the average weights per revenue train mile of plaintiff's train for the fiscal years 1912-1917. Each class of traffic is subdivided to show weight of locomotives, and cars by classes and the traffic. Using 1912 as an example: the first column is

aggregate ton miles passenger, and the different headings distribute those tons between the different elements of the 1587 passenger service. The first column under freight is the total ton miles for the year, and the ton miles of each part of the train and the average are shown. The ten ton factor used for passenger loading is an estimate and is divided between mail and express and passenger and baggage. The locomotive weight takes for its basis the weight of the locomotive and tender in working order plus 60% of fuel and water capacity. The mail and express and baggage are errived at on the space basis. The figures were taken or based upon weights as determined from Company records. They are all based on individual weight units in both passenger and freight services and are correctly taken and applied by me. Defendants' Ex. 315, shows the average weight of plaintiff's passenger equipment per car mile for 1912, 1913, 1914, and 1917 divided into the three groups, sleepers and diners, mail and express, passenger and baggage. The average is stated in tons. This shows an increase in the weight of sleeper and diner equipment in 1917 over previous years; over 1912 of approximately 10 tons per car. I assumed 1915 and 1916 would show approximately the same results as for 1914 and 1917. The weight of mail and express equipment increased 1912-1917 about 13%+.

Upon investigation I find that of the total passenger train car ton miles in 1916, 36.10% were devoted to carrying the intrastate passenger and his baggage; 9.49% for interstate; in the sleeping car subdivision 19.13% of the total car ton miles of the trains were interstate, 7.84% intrastate, 13.13% mail and express, and 14.31% dining. To serve a single passenger they carry in the baggage part of the train .47 of a ton; in the passenger section of the train.

meaning coaches, 2.61 tons; for the Soo route sleepers 7.88
1588 tons, for the C. & N. W. and C. M. & St. P. sleepers 14.64
tons, and D. S. S. & A. sleepers 6.36 tons per passenger mile
on the average. The highest proportion of tonnage to the passenger
is on the interstate trains 3 and 4 and 103 and 104.

The Marquette & Western line is the so-called south track Marquette to Eagle Mills and part of the line to Winthrop Junction which is 17.3 miles from Marquette. It was originally built by interests connected with the Detroit, Mackinac & Marquette to serve the ore country; that line makes practically two lines from Marquette west for a distance of 17 miles through the ore district; that track is used by every west bound passenger train originating in Marquette. It is in constant use in common service from Marquette to Eagle Mills; the north line is the old M. H. & O. line and goes straight west from

Marquette.

Referring to the report of the Railroad Commission for 1885, year ending Dec. 31, 1884, the Marquette and Western filed articles October 12, 1883; was open for use June 9, 1884. The Company's report of operation from June 9 to Dec. 31, 1884, shows average receipts per passenger mile 2.38¢ for all freight 2.20¢, through freight 2.15¢. 302,000 out of a total of 317,000 tons of freight hauled were ore. The average amount received for each ton hauled was 39.05¢ and the ton miles of through freight 5,349,061, and local freight 283,764, totaling 5,632,825. The number of passengers was 28,613, the passengers mile 304,411. The total income was \$134, 328, being passenger \$7,281.59 and freight \$124,483.27.

The M. H. & O. report shows the following statistics for the entire year 1884; total tons of freight 870,749, of ore 765,199 total ton miles of freight 25,767,000. Receipts per ton hauled 81¢ per ton mile through freight 5.7¢ and local freight 2.6¢. The average rate

per passenger mile was 3.7¢ being for through passengers 1589 3.95¢, and local passengers 3.66¢. The M. H. & O. report for year ending Dec. 31, 1883 shows average rate of fare per passenger mile 4¢, being the same for through and local. The rate per ton per mile was 3.41¢ being through freight 6¢ and local freight 3.24¢. The average received for each ton hauled was 81¢.

The report of the Marquette & Western for 1885 states that all the shares of its capital stock are in the treasury of the M. H. & O. which is to operate it perpetually, and that possession was given in May 1885. In the balance sheet of the M. H. & O. for 1885 under the classification "Other Investments" the M. & W. is listed at \$2,011,-

346.93.

I have before me the report of the D. M. & M. for the year ending Dec. 31, 1881, which has a bearing on the original cost of construction on the portion of plaintiff's line east of Marquette. It states that the main line from points St. Ignace to Marquette 151.90 miles was completed and turned over to the Railroad Company Dec. 1, 1881. Page 9, calling for cost of road and equipment indicates that the road cost \$2,528,963.62, being, construction, \$2,350,972.97, and equipment \$177,990.65 or \$16,638 a mile. The items are:

	1, grading and masonary	\$569,403.94
	2, bridging	133,819.86
	3, super tructure, including rails	1,349,892.28
	4, land, land damages and fences	72,431.77
	5, passenger and freight stations, woodsheds	
	and water station	32,565.49
	6, engine houses, car sheds and turn tables	23,178.68
	7, machine shops	3,098.76
	8, interest paid during construction, dis- count, etc., no return made for it.	,
	9, engineering, agencies, salaries and other	100 000 00
	expenses during construction	133,873.65
	enumerated above	32,708.54
1590		
	11, total expended for construction	2.350.972.97
Item	14, locomotives	61,843.43
No.	15, snow plows on wheels	01,010.10
No.	16, passenger, mail and baggage cars	96 960 99
No.	17, freight and other cars	28,369.32
No.	18 machinery and tools	78,021.05
No.	18, machinery and tools	9,756.85
140.	19, total for equipment	177,990.65

Those figures were crossed out with red ink and a note placed at the bottom of the page which reads:

"The road was built by construction companies who received in payment therefor the stock and bonds of the railroad company."

(Report of the D. M. & M. for 1881 marked Defts.' Ex. 316.) The property was then carried carried into the report at \$12,041,-892.01, or about four times the stated cost of construction. The report includes 13.5 miles for sidings.

Plaintiff's railroad was extended west from Michigamme in 1886-7.

The Railroad Commission for 1887 reports as follows:

"The Duluth, South Shore and Atlantic Railway Company has also been formed by the consolidation of the Sault Ste. Marie and Marquette and the Mackinae and Marquette Companies of Michigan; the Wisconsin Sault Ste. Marie and Mackinae of Wisconsin and the Duluth, Superior and Michigan of Minnesota. The above consolidation gives the Upper Peninsula a through line from the Soo, there connecting by bridge now nearing completion over the Sault Ste. Marie river, with the Great Canadian systems of roads to the Atlantic and at Duluth with the Northern Pacific to the Pacific Ocean. This Company also has the work of construction well in hand and will soon be ready for the immense traffic that must of necessity come to it with the completion of its through line."

(Defts.' Ex. 317, being the articles of consolidation, of the Marquette & Ontonagon and Houghton & Ontonagon Railroad Companies, forming the M. H. & O. filed Sept. 2, 1872, produced and introduced in evidence. This exhibit same as Defts.' Ex. 55 before the Master.)

"Mr. Tracy: I might say to the Court, so there will be no misapprehension, that it shows by the record in the case that that figure of nearly Fifty Million Dollars is not claimed by us, and never has been claimed by us, to be the value of this road. It is a one column figure which is arrived at by the old system of bookkeeping, on which they set out their investment in the road and everything they added they added to that column and they never took anything off; so the result of it is, it is absurd to show this Court that enormous sum. After the Interstate Commerce classification was adopted, they changed their method and now add only the net amount.

Mr. Wykes: Do you now admit Mr. Tracy, that you claim noth-

ing for your cumulative figure or investment?

Mr. Tracy: Nothing.

Mr. Groesbeck: You set up there interest on these Fifteen Millions of bonds as a charge against this property, the interest on them as one of these obligations and debts?

Mr. Eldredge: We do.

Mr. Groesbeck: You claim that that money went into the corporation?

Mr. Eldredge: I don't claim anything about it, for I don't know anything about it, only what our books show. We claim it is a lien on that property."

The articles of the Mackinac & Marquette Railroad recite a sale on mortgage foreclosure of the D. M. & M. to Hugh McMillan in 1886 for 1.010,000+, that the property was carried into a new cap-

1592 italization of \$3,040,000.

(Defendants' Ex. 317 is the articles of the Duluth, Superior & Michigan; Defts.' Exs. 313-317 introduced in evidence.)

Cross-examination.

By Mr. Tracy:

I do not mean that trains 3 and 4 and 103 and 104 do not carry intrastate passengers. I stated that they were of the character of an interstate train and passengers do travel on them between local points in Michigan. So far as they run on the South Shore tracks, the run is entirely in Michigan. The south line Marquette to Eagle Mills is used as a loop or double track.

1593 CRESCENT A. PARKER recalled.

Direct examination.

By Mr. Wykes:

The operating ratios (being the percentage of expenses to revenues) of plaintiff in Michigan and outside of Michigan, on the basis of the exhibits of the various experts, are as follows:

	Outside Michigan			Michigan.		
Year.	Delf.	Parker.	Hillman.	Delf.	Parker.	Hillman.
	%	%	%	%	%	%
1914	96.78	98.02	100.06	77.87	77.67	78.42
1915	111.40	111.56	111.20	76.39	76.37	77.55
1916	89.87	91.45	91.10	67.89	67.67	68.03
1917	97.84	99.45	98.84	71.64	71.30	71.52

I have recently analyzed plaintiff's accounts for the years ending June 30, 1914 to 1917, inclusive, and separated them to states and services, the results of my separation being set forth in Defts.' Ex. 325.

In general, expenses have been allocated to states and to services to the fullest extent possible, and, where accounts were not allocated. we have used the nearest possible use basis we could find to assign to states and services. The system totals are the same as Mr. Delf's. Ie and I are agreed on most of the allocated accounts.

After making such allocations as were possible, and then dividing such further accounts as possible on some basis that represented the use for specific accounts, the proper basis and basis used, for the remaining common expenses in the maintenance of way group was the

gross ton mile and time basis.

In that group, in 1917, \$301,025 was assigned on the gross ton

mile basis, and \$103,605 on the time ratio.

Referring to pages 695 and 696 of Defts.' Ex. 325, 1917, summary of expenses, the first group is maintenance of way and structures; on the system total I agree with Mr. Delf throughout; the next

column, total expenses for Michigan, is my result after sep-1594 aration between Michigan and outside of Michigan. for this group is \$1,986 less than Delf's Michigan total for the same, the principal difference being found in the accounts 231, Water Stations, 233, Fuel Stations, 235, Shops and Enginehouses, 247, Telegraph and Telephone Lines, and 275, Insurance. The reason for the difference is that I accept the facilities represented by the first four accounts as being system facilities, and assign them to Michigan on a basis of use, regardless of the geographical location of the structures; e. g., the principal shops are located in Michigan, but I have assigned them on some near factor or basis of use.

The same is true of the other accounts mentioned, water and fuel stations being assigned on the use of fuel in and out of the state, and shops on a ratio of use represented by the repairs therein for Michigan and outside Michigan, and enginehouse expenses on the ratio of apportionment of the expenses of yard and road locomotives between states. Telegraph and telephone line expenses were first divided to freight and passenger on the basis of time and freight and

passenger train miles respectively in states.

The differences enumerated would also make a slight difference in

the items assigned as overhead, e. g. superintendence.

Under maintenance of equipment, page 697 of Defts.' Ex. 325, I have assigned \$252 less to Michigan than Delf has, this being due to the assignment of the accounts, repairs, depreciation and retirements of work equipment, which are assigned by each of us as overhead to the maintenance of way group.

Under traffic expenses, page 698 of the exhibit, there is no differ-

ence between Delf and me in Michigan totals.

Under transportation expenses, page 700 of the exhibit, 1595 I am \$5,797 less than Delf for the entire group assigned to Michigan, the greater part of the difference being in accounts 392, Train Enginemen, where I accepted the engine mile basis for the division to Michigan, and 401, Trainmen, where I accepted the train mile basis for the division. Mr. Delf claimed location for 392 and 401. I rejected this, as he totaled the time spent by enginemen and trainmen outside of Michigan and deducted it from

system totals, the result being that delays in traffic on account of

connections and duty time would all be left in and increase the Michigan portion of the expense.

My method and result is to distribute the duty and delay time over the entire system. Thomaston, the division point, is about 14 miles into Michigan; there, engines and cars are changed for certain trains and crews are required to report 30 minutes in advance of the run, which is duty time; there would be duty time at the other end, but the mileage is a disporportionate, being 14 miles against 109. Mr. Delf divided enginemen on the time slips.

In group, Miscellaneous Operations, page 700 of Defts.' Ex. 325, there is no difference between Mr. Delf and me in Michigan totals.

In General Expenses, page 701 of the exhibit, I assign to Michigan \$364 less than Delf. This difference exists by reason of the previously emunerated differences, the group being assigned as overhead to previous accounts. In the total assignment to Michigan, I am \$8,402 less than Delf.

In the next (3rd) column of the 1917 summary, freight, I am the same as Delf as to allocations. Delf's exhibit, however, had no comparable column. The amount set off by Delf to expenses of maintenance of exclusive freight trackage we do not regard as allo-

cations. I have used the equated track mile basis to divide 1596 that character of expenses. In the equated track mile basis we have taken in certain of the sidetracks and spurs on the basis of two miles of such track equaling one of main track and major branches. My ratio on that basis is ratio #2, given for 1917, on page 524 of Defts.' Ex. 325. This ratio was used to determine what amount should be set out of the common expenses to represent the total expenses of maintenance of exclusive freight trackage.

Page 524 of the exhibit shows how the equated track mile ratio is arrived at, the equation being that each mile of main line and second track are taken as one, while each mile of spurs and sidings is taken as one-half mile; treating the total equated mileage as 100 per cent, freight is found to be 17.28 per cent common, 82.52 per cent and passenger, .20 per cent. This is on the assumption that it costs as much to maintain one mile of main line track as two miles of industrial spurs and sidings. The application of the percentage is found on page 545 of the exhibit.

The total amount set off to exclusive freight track maintenance in

1917 was \$73,538 and to passenger \$851.

To compute the time ratio, Number 4 (Ex. page 527) we found the time of the passenger and of the freight trains in the use of the track. Time in movement only is shown, the non-movement time being excluded, and the time on exclusive tracks being deducted. The ratio is the use of track in switching or road service on the common track represented in the time consumed by each service. The switching time is computed at six miles per hour.

To illustrate the method of application of my ratios, using account 202, Roadway Maintenance, page 545 of Defts.' Ex. 325. Line one indicates the total expenditure shown by the company books for the entire system, \$67,154. Delf's allocation to Michigan

of \$51,502, was accepted. This is made up of the subprimary accounts shown. On lines 9 to 13, the separation
on account of equated track is shown, the remaining common
being \$42,499. This common is on lines 15 to 17 separated to passenger and freight on the time ratio, number 4, above explained.
The time ratio is used because practically all of the expense of the
item is the result of depreciation from natural causes not associated
with the movement of trains or tonnage. On lines 18 to 25 inclusive, the freight and passenger assignments previously made are
brought together, producing a passenger total of \$6,959. On lines
26 and following, this passenger total is subdivided to services on the
basis of the total passenger train car miles, ratio number 3, explained
on pages 525 and 526 of the exhibit.

In arriving at the train car mile ratio, number 3, the mileages made by the respective cars are shown, except where, as in case of mail, express and baggage, but a part of the car is used, then but a proportional part of the car's mileage is included. This ratio is used to divide common passenger expenses between the three services, sleepers and diners, mail and express, and passengers and baggage. On lines 30 and 31, the Michigan passengers and baggage expense is arrived at as \$5,696. Lines 32 to 34 divide that expense on ratio 10, from page 529 of Defts.' Ex. 325, being the ratio of passengers carried one mile in intrastate and interstate to

the total Michigan passenger miles.

Using the account, 202, to illustrate my difference in percentage from Delf. We start with the same Michigan total \$51,502. We then differ in the amount deducted for exclusive freight. To the remaining common he applied the modified revenue train mile percentage of 42.21% passenger and I apply the time ratio of 23.09% passenger. In other accounts, where I used a gross ton mile factor.

the passenger percentage was 25.98. Mr. Delf uses no ratio comparable with my ratio 3, but does use a ratio comparable with my ratio 10, there being no real difference between us on this. The net result of my computation is to attribute to intrastate passenger 70.67% of 57.19% of 23.19% of 82.72% of the amount attributed to Michigan. The amounts from page 545 are

then carried forward into the summary on page 695,

In instances, as account 208, Bridges, Trestles & Culverts, page

546 Defts.' Ex. 325, there was a direct allocation to freight and no necessity of applying the equated track ratio, number 2, or any

other factor

In account 218, Ballast, page 548 of the exhibit is a sample of the Michigan common divided to passenger and freight on the basis of the gross ton mile ratio, number 1; this ratio for 1917 is shown on page 521 of the exhibit. This ratio is made up of the gross ton miles made in freight and passenger services respectively on the common tracks, including switching. To construct this ratio, average weights, of the company's freight cars, as determined by scale weights, and ownership by classes, were taken. For foreign cars, tested average scale weights were taken and correctly applied to cars of the class. These weights were affected with mileage by classes to compute the ton miles.

For the locomotive, its weight including the tender and 60% of its loading capacity for fuel and water is taken and affected with its mileage in each service. For passenger train cars, we ascertained the average weight by classes, and applied that to Mr. Delf's Michigan mileage, assuming 10 tons to the train load. The tonnage of freight

train traffic was furnished company.

The switching ton miles made on common track is a compilation of the ton miles of locomotives plus an average of 4.08 cars in the freight yards for freight switching for the yard move-

1599 ment, and 1.44 cars for the passenger yard movement, and 2.5 cars for the freight train switching movement, and 3 cars for the passenger train switching movement, these averages of cars for freight yard movement being determined by our men in connection with the yard tests, and for train switching by a study of

the number of cars handled at way stations.

The ten tons for passenger loading was based on the assumption of about 300 pounds per passenger per mile for the passenger and his baggage and an arbitrary amount for mail and express. The train loading in freight is nearly 40 per cent of the whole, while in passenger it is three plus per cent. The passenger equipment is not materially changed by the loading, while the freight loading is sometimes two or three times the weight of the cars. I divide on the gross ton mile ratio, 25.98 per cent passenger for 1917, certain accounts which Delf divides on the modified revenue train mile ratio, 42.21% passenger for 1917. The difference, for 1917, in Delf's separations and mine is that in the assignment to passenger service I am \$89,756 less.

After allocating property to the fullest extent possible, I would apply the method of time to the common property, to divide between passenger and freight. That is the use the property has had, measured by time. Before the Master we used that as one ratio or method, then showing a passenger proportion of 34 or 35%. The charge for use of property is analogous to a rent charge for use. I don't feel there is any necessity for dividing the property on the basis used for expenses. I don't think the use of the property is fully measured by the expense. Assuming the two theories correct, I see nothing

inconsistent in dividing the property on the modified revenue train mile ratio and the expenses on the gross ton mile ratio.

1600 The Master found against us on the use of time for the division of property. Assuming him to have been correct. I still think my ratios for the division of expenses are more nearly correct.

Ratio 1a, page 522 of Defts.' Ex. 325, is a subdivision of the ton miles made in passenger service to the several services constituting the entire business; i. e., a classification of the ton miles similar to that of the car miles under ratio 3, page 525 of the exhibit. I have taken the tonnage of each service shown, to reach a ratio or relative percentage to the total of the passenger tonnage. Those percentages are used to subdivide the passenger proportion of the expenses into sleepers and diners, mail and express, and passengers and baggage, as on lines 22-23, page 548 of the exhibit.

The ton mile ratio number 1 is applied to 212, Ties, page 548, for the reason that it is considered that the majority of expenses of renewal of ties is because of traffic-that they are worn out. lieve this, even though a tie would rot out if it never had traffic over The spikes are shaken so the water gets in and completes the destruction, but much of the destruction of ties on this road is caused by the cutting of the tie through rail pressure, which wears them out. The majority of the necessity of renewal falls in this group. Much tie renewal comes because before the tie is worn out the rail is ren-wed, thus destroying the tie, as it would not be economy to put a new rail back on the old tie after it had served part of its pur-The tie would have served under that rail for a longer period than it did, but for the renewal.

Where I regard the wear as the greatest element of depreciation and of cost of maintenance. I apply the ton mile ratio, and where the majority occurs through the passage of time. I apply 1601 Where the tonnage ratio was applied, it was the time ratio. used for the division between passenger and freight of the common expenses, and also for the separation of the common passenger expenses between passenger services, to the point of getting

the final passenger amount.

I divide the passenger expenses between sleepers and diners, mail and express, and passengers and baggage, while Mr. Delf uses the total passenger operating expenses as passenger, including sleepers and diners, and mail and express, excluding the directly-charged costs to sleepers and diners, meaning what is reserved and paid out because of sleeping accom-odations, and at the end Delf has elimi-

nated the mail and express in a gross sum.

Referring to account 201, Superintendence, under Maintenance of Way and Structures, the charge as to Michigan and to the several services has been made relatively with or overhead to other accounts throughout the group. This is substantially the method adopted by Mr. Delf, and the resulting differences are caused by the mathematics of the problem; i. e. the different figures going into the totals. I charge 20.61 per cent to passenger, as against Mr. Delf's 36.07%, for 1917, and divide \$4,451 as against his \$7,811 of passenger to

passenger services, the difference being due to my use of the equated track basis and of the time and ton mile ratios, as against his different separation of exclusive freight track expense and his revenue train mile ratio.

I subdivide the \$4,451 between sleepers and diners, mail and express and passengers and baggage, giving \$2,263 to be divided between interstate and intrastate passenger, as against Delf's \$7,811. The great difference occurs through my elimination of the cost of

sleepers and diners and mail and express.

In account 227, Station and Office Buildings, page 557 of Defts.' Ex. 325, the amount allocated to Michigan is \$11,754. After arriving at the common portion of this item, on line 9, the amount \$4,362, is divided on my ratio 17, which is the relation of the allocated station pay rolls for freight and passenger employees for the various stations in Michigan. At certain stations, there are employees whose duties are exclusively in passenger service, the pay roll charges for them being against the specific service and I have treated those two classes of direct charges as allocations.

Accounts 231, Water Stations and 233, Fuel Stations, page 560 of Defts. Ex. 325, show special treatment, in that they are divided on the basis of the fuel and water accounts under transportation. This

is practically the same as Mr. Delf's method.

Account 235, Shops and Enginehouses, page 561 of the exhibit, also shows special treatment, the items being regarded as overhead to repair of equipment accounts 308, 314, and 326, this method be

ing pursued throughout.

Accounts 247, page 566 of the exhibit and 249, page 567, are subject to special treatment, as shown by the exhibit. The following sheet shows the amounts I allocate and assign on the various bases used:

1603

Maintenance of Way and Structures.

1917.

(Parker.)

	Total		Passen-
	Michigan.	Freight.	ger.
Accounts Allocated	\$70,739	\$66,780	\$3,959
Tracks	74,389	$73,\!536$	851
Accounts Assigned on Time Basis	103,605	79,736	83,869
Accounts Assigned on Gross Ton Miles	301,125	222,392	78,233
Accounts Assigned on Various Bases	11,945	9,424	2,521
Accounts Assigned overhead to others	31,602	25,087	6,515
Total	\$593,405	\$477,457	\$115,918

A number of items under Maintenance of Way and Structures are assigned as overhead to other accounts, being 269, Roadway Machines, 271, Small Tools and Supplies, 274, Injuries to Persons, 275, Insurance, 276, Stationary and Printing, and 277, Other Expenses. These expenses are incurred along with other expenses, and it is natural to expect they would follow in the same way. On this entire subdivision, Maintenance of Way and Structures, I have for 1917, assigned to passenger \$89,756 less than Delf.

Under Maintenance of Equipment, 1917, page 585, of Defts.' Ex. 325, the only difference between Delf and me appears in the accounts 326, Work Equipment—Repairs, 327, Work Equipment—Depreciation, 328, Work Equipment—Retirements, and 333, Insurance, and is due to the fact that we both assigned the accounts as overhead to other accounts to which we have made different assignments, thus

producing a different percentage.

Under the Maintenance of Way and Structures group, I deduct from several accounts a proportional charge for the maintenance of equipment on account of operations of the equipment on the tracks of the Mineral Range; e. g., under account 308, Steam Locomotives—Repairs, page 189 of Defts.' Ex. 325, line 28 shows the Michigan passenger proportion divided relatively with the total passenger train locomotive mileage on the Mineral Range and the D. S. S. & A. Here we have used the mileage on the Mineral Range being 4.39% of the total locomotive mileage, which results in a charge of \$2,123 on account of steam locomotive repairs to the Mineral Range and carried as a decrease against the total charges in Michigan passenger service.

Certain D. S. S. & A. trains operate over the Mineral Range tracks, Houghton to Calumet. The Mineral Range gets the fares and this company pays the expense. It was necessary, in order to 1605 find out the cost of business on the D. S. S. & A. to deduct expenses which were off the line. 43,000 miles of the plaintiff's locomotive operation represents the mileage of D. S. S. & A. trains and of C. & N. W. trains 3 and 4 and C. M. & St. P. trains 104 and 104, between Houghton and Calumet, on the Mineral Range. This company has the entire train expense, and I have thus taken out from our expenses the proportional part that would be caused by the operation on the Mineral Range. To indicate the method and amount of expense charged out on this account, refer to summary of Maintenance of Equipment, pages 696 and 687 of Defts.' Ex. 325. will be found a column headed "Minerai Range," and in that or a similar column throughout the summary appears the amounts charged out of the plaintiff's expenses on account of the Mineral Range operations; that figure is not included in the total figure. which is the next column of plaintiff's passenger expenses. totals of the column shows what is excluded on account of the Mineral Mr. Delf makes no similar exclusion; it is included in his total passenger.

My charges to the Mineral Range in this group (Maintenance of Equipment 1917) are \$4,432, to plaintiff \$104,136, total \$108,568.

being \$3,056 less than Delf's \$111,624.

Under Traffic, my Superintendence should be corrected to be

overhead to the group, which would decrease my intrastate net passengers and baggage expenses for the entire group from \$13,576 to

\$8,356. Before the charge, Mr. Delf and I are the same. Under the group "Transportation," account 372, Dispatching

Trains, page 626 of Defts,' Ex. 325, the system total is divided to passenger and freight on the system time ratio, 42, and the freight and passenger assigned to Michigan on the basis of the freight and passenger train miles respectively, including switching opera-

tions, thus bringing slightly more into Michigan than Delf.

The Michigan passenger item is then divided into its several subdivisions on the passenger train car mile ratio, 3, page 525 of the

In account 373, Station Employees, page 627 of Defts, Ex. 325, the common has been divided to passenger and freight services on pay roll ratio, No. 17, page 530 of the exhibit. After allocation was made to freight and passenger and checked over by Delf and ourselves, the common item, \$84,073, lines 4 and 6, is the same as used The 10% set off to mail and express is arrived at, as indiby Delf. cated on page 627 of the exhibit, on an investigation indicating that over 10 per cent of the item was directly incurred on account of the mail.

Account 376, Station Supplies and Expenses, is divided in the same There is no subdivision of items 373 and 376 to way as account 373. outside operations except the 10 per cent to mail and express. A considerable difference exists between Delf and myself on these items, my assignment to passenger being, for account 373, \$20,792, and for ac-

account 376 \$1,734 less than Delf.

On Accounts 377 to 390 inclusive, Mr. Delf and I agree on the assignment to passenger services. We agree substantially on account

391.

Certain accounts under the Transportation group (See Summary, pages 699-700) show charges to the Mineral Range passenger service for the same reason as explained under the Maintenance of Equipment account. The charges to the Mineral Range under this group are \$14,522, leaving \$332,208, which is charged to the plaintiff's passenger business, making my total passenger expenses for the Transportation group \$25,607 less than Delf's, or \$346,730. The major

differences in the entire group are in the accounts, "Dispatching Trains," "Station Employees" and "Station Supplies & 1607

"Expenses." Under the group, "Miscellaneous Operations," there is no differ-

ence between Mr. Delf and me.

Under "General Expenses," Mr. Delf and I have both divided the accounts as overhead to, or in the same ratio as, the preceeding groups, "I" to "VI." The difference between us, my figures being \$3,646 less to passenger, is because my assignments to passenger in the preceeding groups are less.

My grand total of 1917 passenger expenses, including the Mineral Range, is \$122,065, less than Delf. The results of the division of expenses for 1917 appear in the recapitulation at the bottom of page 701 of Defts.' Ex. 325, and the computations, divisions and allocations are correctly carried forward to the best of my ability. The

methods used represent my judgment as an accountant.

Referring to the division of accounts for 1916, Defts.' Ex. 325, page 331, for 1915, page 161, and for 1914, page 3, the intention has been to divide each of these in the same manner as described for the year 1917. There are no differences in principle, though there may be some slight differences in the mechanics of setting it up. In 1914, there was a different I. C. C. classification, and we followed that. The I. C. C. numbering of the accounts was changed in 1915. The old Series of 1914 began at 1 and ran to 116, while in 1915 the first account is 201. Prior to 1916 there had not been such attempt at allocation on the part of the company as since, but the variations, if any, are as to minor things. I think that Superintendence under Traffic in each year should be made overhead in the interstate and intrastate division and a correction on that account made.

1608 For the years 1914, 1915 and 1916-1917, it was my purpose

intent and endeavor to reach correct results,

The plaintiff's revenue for 1917 is treated in Defts.' Ex. 325, page 705. The amounts are, I think without exception, the same as Delf's Ex. 209, page 5, though I have observed the form of the revenue account and Delf has brought into his total some of the income accounts. We are in agreement in the items on page 705 of Defts.' Ex. 325. Delf's total of \$1,064,800 would be produced by combining my items on pages 705, 709 and 710.

The items shown under sleepers and diners, mail and express and passengers and baggage are the same as Delf's, except I have carried those out into other columns. This is the outside revenue from business in excess of fares. There is no separation by the company

of those fares derived from passengers carried in sleepers.

Delf has included in his total revenue the revenue from sleepers and diners, the same as I have before I divided. He has included the sleeper and diner expense in his total passenger expense. I then subdivide the expenses, charging to sleepers and diners the portion I say should be charged, and exclude it from the passengers and baggage proportion, while Delf, has not excluded that, but has kept them in his passenger business and has assigned them to interstate and intrastate. I have deducted from the revenues from passenger that portion of the revenue derived from sleepers and diners, to offset the revenue as far as it would go against the expense. I had deducted it before I made a division between interstate and intrastate, to determine the intrastate passenger expenses and revenues. On the other hand, Mr. Delf has included the sleepers and diners in the expenses and revenues and in his division between interstate and intrastate.

To show the amount set off to sleepers and diners, page 712 of the exhibit shows the operating revenue of the sleepers and diners as \$70,719, and expenses of the same as \$233,223, which represents a deficiency of \$162,504. There are two deductions in this income account, the first for the rental of sleepers and diners, an amount paid out by the company, and the second, a proportion of taxes. The net result is to charge the railway company with a loss of \$179,867 on account of the operations of sleepers and

diners. If the sleepers and diners were included as a passenger operation, my net income would be reduced by that amount (subject to an adjustment of the revenues from those sources). To complete the comparison, you would have to restore this amount to interstate and intrastate in the proper proportion. The amount of total passenger income stated by me, on page 712 of the exhibit, as \$553,480,

would in this event have to be reduced by \$179,867.

Plaintiff derives no revenue from the foreign sleepers. In my computation, I have attempted to separate the expenses of hauling the sleepers and take it out of the passengers and baggage expenses. In the matter of revenue, the plaintiff gets \$15 a day for the round trip of the C. M. & St. P. trains over the line, Champion to Calumet, and 25 cents a mile for the run of the C. & N. W. With the C. & N. W. and C. M. & St. P. trains to Marquette and Calumet, in addition of those of the plaintiff, there is quite a piling up of trains, and it seems to me there are a good many trains running where a few would serve the purpose. Both of these other lines have a train each way with sleepers to Calumet, and there is a sleeper for each into and out of Marquette.

I have given the passengers and baggage business credit for the fares of passengers carried in sleepers, but have not charged that business with the expense of hauling the sleepers. In fact,

1610 I have charged sleeping car expense entirely by itself, and not into the passengers and baggage part. I have not taken into account but have eliminated the expense of hauling Pullman cars in the final result, to determine whether two cents a mile is sufficient rate. It has been my intention throughout to eliminate, as near as I could arrive at it, the cost because of the sleeper and diner services from the passengers and baggage business carried to earn two

cents a mile.

Page 709 of Defts.' Ex. 325 is substantially the same as Mr. Delf's figures for the same items, the only differences being in the items representing rents received or paid for the hire of work equipment.

Page 710 is substantially the same as Mr. Delf's treatment of similar items, down to the first total, though from that point on I have credited a proportion of the passenger amount to the Mineral Range operations.

On page 711 of the exhibit, the item for taxes is temporary and will be revised as soon as I get the proper figures. I used the accruat basis for taxes from the reports. Mr. Delf first used that basis and has now changed to the actual tax. The result is that, from 1914 to 1917 inclusive, I have charged \$15,146 more of taxes to passenger

than Delf has.

Page 712 of the exhibit represents the totals carried forward. The last line of items across the sheet, "Net Corporate Income," correctly represents the balance upon my allocations to states and services. My final result is a net return for the intrastate passenger business of \$394,469, subject to slight corrections for taxes, superintendence and a couple of other little errors.

The following sheets (Def's 'Exs. 325B, 325C and 325D) show groupings of the allocations or assignments by me on

the various bases for the years 1914 to 1916.

Maintenance of Way and Structures.

1914, 1915, and 1916.

								1916.	
	Total Michigan.	Freight.	Passen-	Total Michigan.	Freight.	Раѕвеп-	Total Michigan.	Freight.	Passen-
Accounts allocated	\$59,957		\$3.184	\$39,000		\$526		\$61,905	1961
Accounts assigned on equated	81,410	80,457	953	56,167	55,525	49	61,690	51,096	F92
Accounts assigned on time basis	107,801	80,346	27,545	80,565	62,080	25,476	127,418	96,737	31,681
Accounts assigned on gross ton miles	346,765	241,314	105,451	228,959	154,823	74,136	191,878	138,208	53,610
Accounts assigned on various bases	34,028	23,912	10,116	6,980	5,418	1,562	22,766	16,490	6,276
Accounts assigned overhead to others	26,247	19,820	6,427	22,514	16,596	5,918	25,172	19,610	5,562
Total	\$656,298	\$502,622	\$153,676	\$114,845	\$336,583	\$108,262	\$481,793	\$383,106	\$98,687

1613 PARKER.

Cross-examination.

By Mr. Tracy:

The proper figure on page 712 of Defts.' Ex. 325, to compare with Delf's final result, may be obtained by subtracting the footings of the column "Mineral Range," from the following column, "Total." This would give \$346,431 as compared with Delf's \$212,467, shown on page 5 of Pltf.'s Ex. 209.

PARKER.

Further direct examination:

In the division of the passenger expenses between interstate and intrastate passenger, I differ from Mr. Delf only in that I have divided the accounts, 373, "Station Employees," and 376, "Station Supplies & Expenses," on the basis of passengers carried one mile,

while Mr. Delf has used ticket sales.

On page 518 of Defts.' Ex. 325, for 1916, under "Interest-Cr.," in the item of \$3,999, I have included \$1,684 interest on the redemption fund, which should not have been done, and which should be excluded. This would reduce the column of total passenger. It is interest of the fund put aside to redeem the coupons issued to cover differences in the fares collected. It would make a difference

of about \$1.180 in intrastate.

The plaintiff's modified revenue train mile ratio, 1917, was 42 21 per cent passenger, the straight revenue train mile, 48.37% and the difference, 6.16%. The difference is due to the inclusion of switching mileage made on common track. The modification is not as great as if made by adding the entire switching to the revenue train miles. The first modified revenue train mile ratio in this case was presented by defendants. It was based on plaintiff's testimony showing that approximately 39% of the time of freight trains was engaged in stational or switching service at way terminals. The modification consisted of the assumption that 61 per cent of

the time was represented by the running of trains, and, increasing that 61 percent to a hundred, the difference in miles was a constructive mileage or stational element, which should be added to the train miles. To that was then added the statistical switching in yards and a percentage of approximately 34 or 35 percent passenger was produced. Plaintiff then suggested further modifications, being (a) a reduction of the 39% for a claimed 15% of idle time of locomotives in stational, (b) an adjustment to bring in omitted yard switching, (c) an adjustment to exclude time on exclusive freight tracks, and (d) a reduction to compute the stational element on the basis of six miles per hour. That was practically the ratio adopted by the Master, and was based on 39% of the time being stational. The Master's percentage was between 43 and

44% passenger. There is practically no difference between the

Master's ratio and plaintiff's present ratio.

All switching time is now computed at six miles an hour, without excluding the first hour, as heretofore. Our tests, so far as I have been able to analyze, have shown that the stational time is above 39%. The tests were made to determine how much of the stational or switching was spent on exclusive tracks and how much on the common tracks; we are in substantial accord as to the percentage which relates to the switching movement.

The tests show that 56.94% of the switching or stational time while in movement was spent on common tracks. The 56.94% took no account of the use represented by the train standing on the common track for 97% of the time. The tests did develop that for about 97% of the time, while the switching operations were going on, the portion of the train not engaged in switching was left standing on the main tracks. While this was shown in the statistics, it

was not car. ed into the computation of 56.94%.

The necessity of determining the time spent on exclusive tracks is that the expense of maintenance of exclusive tracks has been taken out of the remaining common expenses, and in finding a factor to divide the remaining common expenses the elements should relate to the common trackage on which those common expenses occurred. In my figures, where I have used time or ton miles, I have reduced my factor of switching ton miles or time down to 56.94% and included that in my totals. The balance, being on exclusive track, is thrown aside.

The Mineral Range statistical passenger miles were included with those of plaintiff during 1912 and for three months of the fiscal year 1913 (to October 1, 1912). The change came under a contract of October, 1912, under which they operated their trains over the Mineral Range the same as now, except they paid it a track right privi-

lege and retained the fares.

Defts.' Ex. 326 correctly sets forth the statistics and percentages shown on it, being the number of interstate and intrastate passenger miles. This shows a marked falling off of interstate passenger miles in 1915 as compared with previous years. In 1912 and 1913, the number of interstate passenger miles was approximately 11,500,000 each year, in 1914, 13,400,992, and in 1915, 12,757,022; in 1916, they dropped to 8,597,088, and since that time they have not reached ten million. I believe this falling off is entirely due to war conditions shutting off immigration and the return of foreign population to home countries. Before the war, plaintiff ran emmigrant trains.

In examining its statistics to 1913, I found many prepaid orders for tickets, it being the custom to that time for persons in this country desiring their freinds come across to this country to purchase

prepaid orders, being orders for railroad and boat fare for 1616 persons desiring to come this way; there has been a marked falling off in this business in this period; in fact, it is now very small. I know of no other condition to which this marked falling off and continued low amount of interstate passenger miles could be ascribed, unless it is being routed over the Soo Line, which also belongs to the Canadian Pacific. There was a falling off of over four millions, 1914 to 1915, in intrastate passenger miles. The year 1914 was testified to by Delf as having a great volume of business in the Copper Country, and I don't think that a fair year for comparison, they having had over a million passenger miles of soldiers.

I have, on Defts.' Ex. 326, computed a ratio for the proportion of intrastate passenger miles to the total, based on average statistics for five years. The exhibit shows computations and comparisons on the basis of the relations between the interstate and intrastate passenger miles having remained the same and the actual conditions through

their having fallen off due to the facts testified to.

(The Court called attention to the fact that there was an apparently abnormal change in statistics of 1914. This led to the revision of the exhibit, which is again referred to later.)

Since 1910, there has, with the exception of 1914, been a gradual falling off of interstate traffic, down to the last year. Even for 1914 the aggregate is not as high for interstate as it was in 1910, and 1914 is less than 400,000 higher than for 1911. The 1915 interstate was about 24% below the average for the previous five years; while the 1915 intrastate was 2.5% below its average for the previous five years, if the Mineral Range mileage had been included in 1915, as in some years previous, there would probably have been no falling off in intrastate.

1617 The permissible interstate rate on this road, 1910 to 1917 has been constant, so that the increase in passengers cannot be attributed to change in rate. During this period, the rate actually

charged intrastate passengers has remained constant.

PARKER.

Cross-examination.

By Mr. Tracy:

I began my work of analyzing plaintiff's accounts for 1914 to 1917 by going to Marquette, March 18, 1917, and remaining thereto to November 1. I was furnished access to all its books and records, and whatever material Delf had. I had two people helping me. Mr. Hillman was there, and he had a force varying from 10 down to five. We were furnished the statistical matter shown in Pltf.'s Exs. 202 to 205 the latter part of April. In April we were also furnished Delf's computations of operating expenses and revenues and operating results, 1914 to 1916.

While these statistics and computations were, in general, in the same form, the figures have been changed some. In general, in dividing plaintiff's expenses to find the proper amount attributed to the intrastate passenger traffic, I followed Mr. Thompson's methods. I would give substantially the same arguments and reasons as given

by him.

The question of the use of common tracks in switching arose after Thompson's testimony; I have brought in the ton miles and time; I apply them to the division of the same accounts to which he applied them, without deviation. In assigning expenses of exclusive freight track, he used a three to one equation. I changed it to two to one. The \$73,538 which I assign to exclusive freight tracks is assigned through the use of the equated track ratio. Other amounts were assigned overhead on the basis of those assignments and some were

allocated. I don't think the total amount attributed by me to Maintenance of Exclusive Tracks would equal \$91,000.

Page 527 of Defts.' Ex. 325 shows the time ratio. The adjustment made or compensation allowed to the freight trains for the amount of time they spent on passing tracks waiting for passenger

trains, and vice versa, does not appear.

Thompson testified that in preparing his ratios he assumed 2.75% of the time of freight trains waiting for passenger trains. I did not use that same figure, but made independent study, and the factors were comewhat different. I found the passengers delayed the freights 1.68% and the freights delayed the passengers .025%. We are not necessarily in disagreement, as our computations relate to different periods. My computation on page 527 of Defts.' Ex. 325 shows passenger trains running about 24 miles per hour and freight trains at a little less than 10. The figure of 2.0227 for mixed trains should

le 2.9227 minutes per mile.

By this time ratio, number 4, I measured certain items of expense, by comparing the amount of time passenger and freight trains spent between terminals. Assuming a passenger and a freight train both started from St. Ignace at the same time, and the passenger train went enough faster than the freight so it reached Marquette, turned around and went back to St. Ignace, completing the double trip over the road at the same time that the freight arrived in Marquette on its single trip, according to the time theory, the use of the common property by those trains would be the same. The passenger has had the same number of hours' use of the property that the freight train has. In common with Thompson, if in my opinion the cause of the majority of the expense was due to weather I applied the time ratio, and if it was due to wear I applied the gross ton mile ratio.

Of account 373, page 627 of the Exhibit, I allocated \$79,-331 to freight and \$11,413 to passenger, leaving \$84,073 common, which I apportioned between passenger and freight on the relation of the allocated part. This was on the theory that you might expect the common work to have been rendered for the two services in the proportion of the allocations. The allocations were at the Soo, St. Ignace, Marquette, Negaunee, Ishpeming and Houghton. These are the larger points on the line, which are big enough to afford separate passenger and freight forces. It would follow that these proportions were established to divide the expenses of an agent at a point like Wetmore.

The passenger proportion of the station expenses at the Soo does not appear in the Station Employees account, but in the Joint Fa-

eilities account.

St. Ignace is a town of three or four thousand. It is a main transfer point on the line; freight has to be rebilled, and less-than-car load freight consolidated, and they have a large force; I don't know how many in the transfer portion or how many for the local freight.

Marquette is a main division point, and all freights into it are

broken and made up again for sending out on the different divisions.

Ishpeming is the transfer point of the C. & N. W. A large part

of their freight is rebilled, and carload freight consolidated, there; they maintain a transfer point and sheds there jointly.

At Houghton, there is a connection with the Mineral Range and

the Copper Range.

There is a consolidation of freight at all these points, more or less, and rebilling and transferring, the same as done at

1620 Champion, Sidnaw and other points.

The expenses of the agent of the Marquette coal docks are

kept in the Station Employees account.

"Q. So you have taken the allocated expenses at the Soo, where the allocated portion of the passenger is not at all representative of the total passenger expense; you have taken the allocated expenses at St. Ignace, where necessarily a large part of the freight expense must be due to the fact of it being a transfer point; and the expenses at Marquette, Ishpeming, and Houghton, where a large part of the freight expenses must necessarily occur, being a transfer point, and used that as a measure for determining the division of the expenses of the agent at Wetmore and Seney?

A. Not solely, there; I have used it for the division of expenses for every station, and that includes Wetmore, Munising, Junction,

and every other terminal or exchange point-everything.

Q. And the result of that is that only about 12 per cent of the Wetmore agent's salary is assignable to passenger, is that it?

A. I should think that would be about a fair proposition for Wetmore too.

Q. Based upon those allocations which I have called your attention to?

A. Based upon my notion of it."

The taxes for 1917 are not yet levied. Upon the question of use for the fiscal year 1917 of taxes paid for 1915 rather than 1916, the tax rate in Michigan, in the odd year is generally higher than the preceding year. The efforts of the Tax Commission in equalizing

property in the past few years has also disturbed the average rate, and, other things being equal, the 1917 tax might not be heavier than 1916. I have taken taxes on Delf's accruals, as shown by the books, and he has taken the estimated basis, with the result that my taxes for the four years are \$15,000 more than

his. I intend to change this.

As shown on page 712 of Defts.' Ex. 325, of the total passenger operating expenses, about 36% is assigned to sleepers and diners and 12% to mail and express. The amount to be assigned to those services would vary with the total passenger operating expenses. Delf's passenger operating expenses are larger than mine, and, subdividing his passenger operating expenses between sleepers and

diners, mail and express, and passengers and baggage, on my percentages, would attribute an even greater loss to sleeper and diner business. On his figures, ly the use of his train mile ratio, about \$43,000 more would be assigned to sleepers and diners than I assigned. If there is a loss, it would increase the loss. Mr. Delf's increased expense would increase the deficit and decrease the profits. In my assignment to sleepers and diners I assign a proportion of the haulage cost. I assign a proportional part of all expenses excepting the Traffic group, Station Employees and Station Supplies and Expenses. The result of my computation is to show that in 1917 plaintiff's sleeper and diner business was conducted at a loss of \$179,-867 (subject to adjustment for taxes), and a loss in 1914 of \$199,-141.

I don't advance the claim that the railroad should abandon that business, to save that amount of money. That is a proportional part of the passenger expenses. In regard to mail and express, I follow the same system, assigning a portion of Maintenance of Way and Structure expenses, superintendence, transportation, and items of that kind—in fact, of practically all accounts except the

show a mail and express loss of \$8,616, subject to adjustment for taxes. I do not claim that you could save that by abandoning the business. That, with every other thing in the process of the division of accounts, has been put together on a proportional basis. Very little would be saved in the wages paid engineer, fireman, conductor or brakeman if the mail and express business were dropped out. There would be no saving in the upkeep of fences but station buildings would be a little different, as they are used for the storage of mail and express, and portions of them are occupied by the express companies. I cannot say as to the proportion to be saved by cutting off this business. There is a use of fuel and water for the tonnage moved.

and other transportation accounts would be affected. I don't think the plaintiff has an exclusive mail and express car, though they have some in these foreign trains. The South Shore car is a baggage,

mail and express car, with several compartments.

If they were starting business without the mail and express business, there would be no provision for them in the cars. Without this business, I think there would be a proportionate decrease in the weight, dimensions and expense of haulage, I don't think that you must treat the mail and express as a by product if you separate it. I don't believe I can answer that the mail and express is a by-product, on this road. The business is all interwoven, and I don't think I

can say which one is the by-product of the other.

Now having the equipment, if the mail and express business were eliminated, the baggage car would not be reduced in weight, space and dimensions, but if they were getting new equipment to take its 1623 place it would very likely be reduced a certain percentage. We

might put the baggage compartment in another car. The weight of the car wouldn't be reduced much if it carried only baggage. I assigned no part of the baggageman's wages to mail and

express.

Page 330 of Defts.' Ex. 325, 1915, shows the total net return from freight as \$198,437, and from pasengers and baggage proportion That comes in part from the freight operating expenses being higher than passenger and in part because the freight business dropped off in that year.

Page 160 of the exhibit, 1914, shows net freight return, \$48,401.

Page 516 shows net freight revenue for 1916 of \$483,195.

The Master, in assignments which we contended attributed too much to passenger, assigned about one-third of the property to passenger business. In 1916, I show the freight and passenger net returns nearly the same, and for 1917 the freight return was considerably less than passenger, being somewhat due to increase in freight wages.

PARKER.

Redirect examination.

By Mr. Wykes:

If the entire passenger business were taken off the road, certain of the costs e. g., maintaining structure would go on undiminished and unincreased if there was nothing but the present freight business.

I do not know which is the by-product of the other on this roadthe passenger business or the freight business. I think my theory of making the assignment to services on the proportional basis in direct line with the rule in the West Virginia passenger rate case and the North Dakota coal rate case, and I have intended to carry out The proportional theory is carried out from start

to finish, including the division between interstate and intra-1624 state passenger business, on the ratio of passengers carried one We treat the passenger in one service as being the equal of mile.

the passenger in the other, regardless of density of traffic, though increased volume in practically everything decreases the cost per unit. If the proportional theory is abandoned in the separation of costs

to mail and express and sleepers and diners, it should also be abandoned in the division between interstate and intrastate passengers upon the ratio of passengers one mile.

C. A. PARKER, recalled. 1625

Direct examination.

By Mr. Wykes:

Referring to Defts.' Ex. 325, ratio 1, gross ton miles on common track, appears on p. 521. I obtained the ratio and computed the tonpage as follows: The mileage of freight train cars was divided into classes with respect to whether foreign or domestic and whether loaded or empty, with further division or class of ore cars. Weights were determined from, daily weighings at the Marquette scales, those given in the several appraisals, and those given by the Master Car Builders and we depended on scale weights for the average weights of foreign

These particular weights were applied to classes of cars in groups according to freight mileages in Michigan. The caption to ratio 1 is "Michigan Gross Ton Miles on Common Tracks." is no tonnage in the columns "Total" or "Freight" which is not made on the common track. I obtained these statistics from the Company. My request when I first went to Marquette was for the ton miles of traffic on the common tracks on the main line. Delf modified some of the early ton mile statistics which he furnished me in two ways: first, by a change to convert long tons into short tons in the ore business and second by the elimination of ton miles not on common track, The computation from car miles into ton miles was made by myself from the statistical records of the car miles on plaintiff's tracks. I satisfied myself that the car miles included only those made on common track having a conference with Delf on the sub-I had had experience on the road in the past, in 1912-1913, I compiled similar data. Then we computed and made deduction from the ton miles in freight service on account of the ton miles of cars. lecomotives and freight on exclusive track, as we did not wish to burden the common track and mileage with ton miles on ex-

1626 clusive tracks as we were setting off those expenses by an equated track ratio. During 1917 when computing for years 1914-1917 I started to do the same thing again, and after conference with Mr. Delf, comptroller and Mr. Kemp, Auditor, I decided there was no necessity for any further reduction and made this note in my memorandum on pages similar to my previous data, on the subject for 1912-1913 "No data computed for these pages as Delf data of traffic excludes ton miles made on the exclusive ore branches." This applies to the train load and that was the figure given me for this par-

ticular year.

The third item, locomotives. Those were computed individually. Each engine's total weight in working order plus tender with 60% of its rated capacity for fuel and water was taken. To this the Michigan mileages of movement were applied. The explanation with regard to my request for statistics applicable solely to common track applies to the mileage as well as to train loading. The basic figures were obtained from the Company. Our own investigations covered the tonnage and not the miles. We did not attempt to check up with mileage but my request was specific and thoroughly understood. Throughout the computation of ratio 1, I have attempted to include in it only the things indicated in the caption "Michigan gross ton miles on common tracks."

Defts.' Ex. 337 is a tabulation to reassign (for the purpose of meeting a possible theory), expenses set off to sleeper and diner business for 1917, to the respective inter and intrastate passenger and baggage business. The first five sheets are extensions or subdivisions of ratios appearing on Defts.' Ex. 325. My ratio 1a, Defts.' Ex. 325, p. 525, shows the Michigan passenger gross ton miles on common tracks for

1917. The total 98,186,235 ton miles under the caption
"Sleepers and Diners" on p. 522, is distributed on sheet 1 on
Deft*.' Ex. 337 among the several sleeper routes and diners
as appears from the captions. The Soo route ton miles is the miles

of Sleepers St. Ignace to the Soo times the average ton weight of The C. M. & St. P. and C. & N. W. ton miles, includes the foreign sleepers west of Marquette and into the Copper Country. The ton miles of D. S. S. & A. sleepers is the mileage times the average The foreign diner ton miles comprehends the foreign diners on C. & N. W. and C. M. & St. P. trains west of Marquette. miles of D. S. S. & A. diners is the miles of diners of the company in Michigan. In each column is included the proportion of the locomotive weight and the distances travelled and below is a distribution of switching carried in to subdivide gross ton mile ratio 1-a. Sheet 2, Defts.' Ex. 337, divides the sleeper and diner tonnage 97,109,603. ton miles found in my ratio 1-b on Defendants' Ex. 325, p. 523, between the several sleeper and diner routes and services. ence from sheet 1 is that sheet 2 excludes car ton miles in trains not handled with plaintiff's power or crews.

Sheet 3 treats of the sleeper and diner car miles shown in my ratio 3, Defts.' Ex. 325, p. 525, and classifies into routes as indicated by the caption. The first two sheets ratio 1, 1-a, and 1-b, are ton mile ratios and sheet 3, ratio 3, is a car mile ratio. I used these to apply the same ratios as were applied in Defts.' Ex. 325. Sheet 4, Defts.' Ex. 337, is a division of switching at the various yards accord-The sheet 5, is a memorandum to indicate ing to the cars handled. what accounts were made overhead throughout the calculations.

On Defts.' Ex. 325, p. 696, I had summarized maintenance of way and structures expenses for 1917, assigned to sleepers and diners as \$40,619. The first large sheet of Ex: 337 takes the items forming this amount applies the ratios found for division among routes as indicated by the column headed "basis of subdivision" and separated the items making up the \$40,619 to the several routes or services indicated by the captions. All the way down the page wherever a description is given as such a ratio description it refers back to one of the previous sheets and gives you the factor by which each of these columns is produced, with the possible exception of Accounts 231, 233 and 235. When in that column the word "overhead" is used, the basis of division can be obtained by going back to the preceding sheet marked "Overhead." This sheet will explain accounts 231, 233 and 235, the percentages also being there. The next sheet, maintenance of equipment group, shows the sleeper and diner expenses divided as indicated by the numbers shown in the column "Basis of Subdivision," which compares with the basis used in Defts.' Ex. 325, upon the percentages shown on the previous sheets. This sheet in the third column, makes "Adjustment to Mineral Range," made because in the first instance I charged no part of the sleeper and diner to the Mineral Range, while I now make this adjustment attributing to it an aggregate of \$407 for accounts 317 and 318.

What I have said will cover groups 4, 6 and 7 and the recapitula-

The grand total at the bottom in recapitulation (Defts.' Ex. 337) is the total of my recaritulation for sleepers and diners in Defts.' Ex. 325, p. 701, \$233,223. Following the line across the sheet the figures represent my adjustment for the Mineral Range and assignments to the several routes or services mentioned on the basis of ton miles, car miles and every factor which I used for like purpose in distributing the total amount in Ex. 325. These totals are carried

forward into the next page under the subcaption "Operating Expenses" and are combined with items from p. 701 of Defts. 1629 Ex. 325, e. g. the Mineral Range expenses of \$18,954 are increased by the adjustment made to include its proportion of the sleeper and diner expenses. In the column headed D. S. S. & A. passenger, is the bringing together of items showing the total expenses of the Michigan passenger business, less the Mineral Range. The next column shows the mail and express \$77,743. The various captions under "Sleepers" and "Diners" show the amounts of sleeper and diner expenses attributed to the various routes or services. the lower half of the sheet is a "re-distribution." Under this re-distribution the sleeper expenses for the various routes are combined with the passengers and baggage expenses and are then separated to interstate and intrastate passenger, baggage and sleepers upon the The Soo route sleeper expenses are diratios shown in the notes.

My separation of the sleeper expenses into routes was for the purpose of getting the amounts to which to apply the appropriate factors of divisions between intrastate and interstate, those factors being shown in the notes at the bottom of the sheet. Those factors or percentages were the results of our analysis of the passenger miles in foreign and D. S. S. & A. Sleepers in conjunction with Delf's analysis. The percentage under Note (a) is derived from Defts.' Ex. 311, 88.64% being the percentage of passenger miles intrastate to the total riding in sleepers on the Soo route in 1917. The expense of Soo route sleepers was assigned between inter and intrastate

vided to inter and intrastate 88.64% intra, the foreign sleepers

14.05% intra and the D. S. S. & A. sleepers 33% intra.

upon that percentage intrastate.

The passenger miles in C. & N. W. and C. M. & St. P. sleepers for 1917 indicate a percentage derived on Ex. 311, of 14.05% intrastate passenger miles to the total and that percentage was applies to separate the expenses of those sleepers to inter and The percentage of passenger miles in coaches 77.34% intra was derived from Defts.' Ex. 313, and that percentage is applied to the division between inter and intrastate passenger of the common passenger and baggage expenses which I had previously divided on the ratio of passengers carried one mile, or 70.67% intra. I have now raised my percentage of intra passenger miles to 77.34%. That comes about by reference to Defts.' Ex. 313, by the fact that we have deducted the passenger miles made in sleepers from the total passenger miles in Michigan and the remainder produced a higher percentage intrastate. I have divided those expenses which relate to the train, not including sleepers, on the ratio of passengers riding in the train exclusive of sleepers. This is not exactly right because the baggage accom-odations are provided for everybody and if you knew how much the expenses of baggage are they should be divided on the basis of 70.67% to intra being the passengers carried

In other words taking account of the fact that bagin your trains. gage expenses are in the \$323.048 divided on the ratio of inter and intra passengers in conches, 77.34% the ratio should be nearer the 70.34% intra as baggage facilities for persons riding in sleepers are Generally speaking, on the basis of including the sleepers in passenger business, as I now do, the computation to divide the sleeper expenses between inter and intrastate is on the basis of the use of the sleepers by individual routes by the inter and intrastate passengers. In this I separate the sleeper expenses including a proportion of the locomotive from the balance of the train and then reassign this separate sleeper expense to inter and intra services each on the percentages shown on the individual route and have finally brought it into the totals of passenger, baggage and sleeper business. intrastate and interstate. The result of my computation is that a different proportion of expense is charged to inter and intrastate business than if the sleepers and passengers were not segregated from the balance of the train. The revenue of the Soo sleepers is divided on the ratio of 33% intra. pose was to divide the direct sleeper revenue as it was earned, and as Mr. Delf says it was carned 37.27% intra, that is about it. On the last sheet the items are combined with the income account. diners in my treatment have not been changed by these computations. They are sub-divided into classes as foreign "and D. S. S. &

A." but are not brought back into the passenger and baggage business and I have used no similar factors for dividing those between inter and intrastate. The revenue from the diners is allowed as an offset against the charges against diners. The revenues from the several services are exact and no charge has been made. ances shown in Defts.' Ex. 337 are: Michigan passenger \$378.475, D. S. S. & A. passenger \$399.569, mail and express deficit \$3,271, foreign diners deficit \$55,775, passengers and baggage including those in sleepers \$465,725. Additions are then made from the income accounts as shown on page 712 of Defts.' Ex. 325. have put into intrastate 33% of the sleeper revenue; Delf says it should have been 37.27%. The losses on mail and express and They are not absorbed diners are all set aside from my final result. by the passenger and baggage business. The final \$479,058 would have been about \$411,929, if the passenger and baggage business had absorbed the mail, express and diner loss.

(Mr. Tracy states that plaintiff is willing to assume that Parker's ratios for ton miles on common track can be regarded as substantially correct. (The record shows the only objection to Hillman's ton miles is that he adds for company freight. Plaintiff claims that the first column in Hillman's factor 13, p. 218, Ex. 329 "all tracks"

is correct and that there are no ton miles made on the road 1632 other than as shown in the first column.) (Mr. Hillman testified that the caption "all tracks" was an error and that that caption should appear below; just above the two items of switching. Plaintiff claims the caption correct because they insist there is no tonnage in addition to that shown in the first column and Hillman says there is additional tonnage which is made on exclusive

tracks. Hillman's and Parker's ratios are based upon the total of the second column and plaintiff is not attacking the ratio at all. The question of what is included under "all tracks" is merely to be used as the basis for an argument and the question is academic.)

Defts.' Ex. 337 is prepared upon the theory of letting the mail and

express and diner services bear their own losses.

Defts.' Ex. 338, 1917, is prepared by me for the purpose of excluding from the passenger and baggage service that portion of the sleeper expenses attributable to the excess weight from the weight necessary to carry the same passengers in ordinary passenger equipment.

The third column of figures shows the actual ton miles of vehicle or car in the designated service per passenger per mile. There being for each passenger per mile .411 tons of baggage equipment moved, for each passenger in coaches 2.320 tons, for passengers in sleepers on Soo route, 6.083 tons, on C. & N. W. and C. M. & St. P. sleepers, 14.121 tons, on D. S. S. & A. sleepers 7.10 tons. The .411 times the intra passengers indicates 9,711,955 ton miles of baggage service chargeable to the intrastate passenger. The passenger miles in sleepers intrastate were computed and carried into the intrastate column at the average weight required for a coach passenger instead of at the weight of equipment actually carried for serving those pas-

sengers when riding in the sleepers on the various routes.

The reduction in weight is caused by the fact that the coaches weigh less than the sleepers and that the loading of sleepers in number of passengers are very low as compared with the coaches.

The passengers carried on the Secretary were a trifle less than

in number of passengers are very low as compared with the coaches. The passengers carried on the Soo route sleepers were a trifle less than 10 per car mile; in the other foreign sleepers, it averaged 5.04 and of that 5.04, .79% of 1 passenger per car mile was carried. pose of this exhibit is to show the effect if the passenger service is relieved of the burden of carrying the excess weight used in carrying the sleeper passengers. The figures in the last two columns show the tonnage of equipment required in carrying of passengers using the average weight of equipment required for passengers in The third from the last column headed "Excess of Sleepers" shows the excess ton miles used in 1917 in the carrying of passengers in sleepers. The weight of diners and of mail and express cars is shown; from the car ton miles, percentages for each service are computed being mail and express 14.06%, diners 12.46% excess om sleepers 18.16%, interstate passengers 16.23% intrastate passengers 39.09%. There is no change in the former item of traffic and no change in the former treatment of diners and observation I have no factors applicable to the latter. The above was a re-distribution of ratio 1-a, distributing the car ton miles between the classes of service mentioned. The same process was followed with reference to ratios 1-b, 3 and 3-a, found on the second and third sheets of Defts.' Ex. 338, the notes given being self explanatory of the slight difference in treatment. The only constant item in any of these is the mail and express. The result is to exclude diners and mail and express from passenger service.

Sheet 4, "Switching in Yards" is an analysis of factors on p. 531 of Defts. Ex. 325 and the items are here distributed on the basis of excess ton or car miles of sleeper or diner service. These subdivisions are switching applied to certain of the switch-1634 ing and yard accounts being applied to the individual yard in

each case.

The next four pages following the first four, apply the ratios or percentages to the different items of expenses separating to the service listed in the captions upon the percentages arrived at and shown on sheets 1-4.

The last page of the exhibit summarizes the expenses thus distributed, and the operating revenue and income account down to The last line shows the net result after taking out the additions and deductions shown on Defts,' Ex. 325, producing the figures which follow as being net corporate income applicable to taxes and to corporate use for dividends and interest. The figures in the first column are the same in Ex. 337 as is the case with all columns to "Excess of Sleepers." The \$63,585 under column "Excess of Sleepers" does not enter into the division between inter and intra state passengers. The amount I divided between interstate and intrastate on this exhibit, 338, is \$543,845, net corporate income as against \$479,056, on Defts.' Ex. 325. In Ex. 338, I still have charged against the sleepers \$64,831, and the difference betwen that amount and the amount in the \$179,867 shown on Defts.' Ex. 325, p. 712, as sleeper has been assigned to or absorbed by interstate and intrastate passengers and baggage, while in Defts.' Ex. 337 the sleepers have been assigned into the interstate and intrastate traffic. A difference between this exhibit 338 and 337 in results is because here the baggage is absorbed and in Ex. 337 it is subject to the explanation there made. I have the distribution of taxes under way but have not distributed them so as to get a final net to apply to the property.

(The State's first claim is that sleepers and diners, mail and express should be treated as an outside service and excluded from the passenger service.)

Defendants' Ex. 326a refers to and modifies Defts,' Ex. 326, the question having arisen that the year 1914 being somewhat abnormal might prevent fair results.

The first (left) half of the sheet is a recapitulation and recomputa-

tion omitting the year 1914 from the average figures.

The right half of the sheet is a computation of passenger revenue requested by Mr. Tracy and should be applied in the same manner as the passenger miles on the left hand side of the page. This is mathematically accurate. I have not used the percentages on Defts.' Exs. 326 and 326a for anything in this case.

1636 C. A. PARKER recalled.

Direct examination.

By Mr. Wykes:

Defts,' Ex. 343 is a distribution of the 1914 Michigan property value to freight and passenger, and to interstate and intrastate pas-The totals are taken from Defts.' Ex. 332. After inserting the allocations to freight, passenger and common services, the commonly used property in the first sub-total for the schedules listed. shown as \$5,429,028, has been assigned to freight and passenger business on the basis of time (Ratio 4), for 1914, 25.60 per cent passen-The results of that assignment are carried into the two columns, passenger and freight. The following schedules, 19a, 19b, 21, 22, 23 and 26, have been assigned individually on the basis indicated in the description at the end of the line for each item. From the sub-total immediately following this group of figures, all land items were deducted, though the deduction does not appear on the tabulation. am speaking of the sub-total, \$8,182,554, passenger \$1,603,039, freight \$6,579,515. Excluding the land items, the relation existing between the net figures is for the passenger proportion 21.19%, and that has been applied to the common portion of the schedules, 20, 21, 27, 29, 33, 38, 39 and 40. For schedules 30, "Locomotives," 31, "Passenger Train Cars," and 32, "Freight Train Cars," Hillman's apportionment, and for the last two items the direct allocations, are used.

The total following schedule 32, of \$11,392,206, passenger \$2,-262,069, and freight \$9,130,137, excluding land, produced the percentage of passenger, 21% and this is applied to the division of

schedules 41 and 42.

The Grand total result of the Michigan valuation for 1914 is \$11,-674,751, \$2,321,403, passenger, and \$9,353,348 freight. The passenger item is divided to interstate and intrastate passenger on the ratio of passengers carried one mile in the respective services, the result being intrastate passenger equals 64,69%,

equals \$1,501,716.

Defts.' Exs. 344, 345 and 343 are separations of property for 1915, 1916 and 1917, respectively, and the description with reference to 1914, Ex. 343 is applicable to each of these years, the only

difference being those caused by different percentages.

The figures which I put in relating to sleeper travel were the result of a careful analysis and special investigation of that travel, by counting conductors' card reports regarding every passenger mile and every passenger. It was made with the purpose of being accurate, and, while not rechecked, was carefully made. Our figures would come very closely to Mr. Delf's if we restored the mileage deducted as being made on the Mineral Range. I cannot understand why the Mineral Range mileage would not appear, even though there was some question about Mr. Delf's sleeper mileage. The statistics of D. S. S. & A. miles in those sleepers, are kept as to D. S. S. & A. operation and revenue.

We did not know of any discrepancy between our figures and Delf's

when we left Marquette.

Defts,' Ex. 347 assembles the values and net corporate income from previous exhibits, adjusted for taxes in accordance with Delf's Ex. 210, and shows net returns upon the value of plaintiff's property, as follows:

	Total			Passenger	& baggage.
Year.	Michigan.	Freight.	Passenger.	Interstate.	Intrastate.
	%	%	%	%	%
1914		0.48	18.02	22.98	26.60
1915		1.75	11.07	14.46	17.92
1916	. 7.19	6.00	14.72	19.84	20.47
1917	. 6.47	4.23	17.17	24.40	24.99

1638 I have deducted no assumed loss and have not taken into acount either of the exhibits in which I made special treatment of the sleeper business. This is based on Defts.' Ex. 325, making the correction indicated for taxes. The mail and express and sleepers and diners are excluded from the columns, passenger interstate and intrastate.

1639 George E. Fisher, a witness for defendants, produced before the Court, Nov. 28, 1917.

Direct examination.

By Mr. Groesbeck:

There were no engineering charges on locomotives purchased by the D. T. & I. and Toledo & Detroit Railroads in 1916. The freight charge would have to be added to the cost shown in the contracts.

1640 L. C. Smith, a witness for defendants, produced before the Court, on Nov. 28, 1917.

Direct examination.

By Mr. Groesbeck:

I am Deputy Highway Commissioner of Michigan having held that office four and a half years and am familiar with the work and records of that department. It is a part of the duty of the department to build bridges, particularly in trunk line highways. I have investigated to determine the average price paid by the State for steel in the construction of bridges. The steel bridges built by the department vary from 50 to 150 foot span, and have been constructed all over the State. The average price for the fiscal year ending June 30, 1914, for structural steel in place and painted, was \$3.20 per hundred, and for the year ending June 30, 1915, \$3.70; for the year ending June 30, 1916, \$4.94. The raise in price began at approximately the same time that war orders were placed in this coun'ry after the beginning of the European war. While our department

is building some steel bridges, we are in the main, changing to concrete because of the present inflated price of steel. In my opinion the cost of highway bridges fabricated and erected is slightly greater than railroad bridges as the highway bridges must be shipped by rail and then by wagons or trucks over country roads and the facilities for erecting highway bridges are not as modern or economical as those for railroad bridges. Railroad bridges run heavier as a rule and the fixed charges are therefore less per pound.

Cross-examination.

By Mr. Tracy:

I make my comparisons as a matter of opinion verified by consultation with men who sell bridges to us as well as to railroads. I would not say that their figures were based upon already constructed railroads. Figures of recent years would be for bridges in exist
1641 ing railroads. I am acquainted with the country through

which plaintiff's railroad runs. Considering the maintenance of traffic I think it will cost as much to install a bridge on this road now as to take it in by team haul, assuming the railroad to be built new. The cost to the department of steel purchased for the year ending June 30, 1917, in place, was approximately \$6.50 a thousand.

1642 HAZEAL J. PAYNE, a witness for defendant produced before the Court, Nov. 28, 1917.

Direct examination.

By Mr. Groesbeck:

I live in Detroit and am a civil engineer. In September 1881, I went to work for the D. M. & M., my first work being the running of preliminary lines Marquette to Ishpeming and Negaunee for the Marquette and Western; at that time the line St. Ignace to Marquette was just being completed. The M. H. & O., was in operation from Marquette to L'Anse. Neither of the extensions Soo Junction to the Soo, or Nestoria to Duluth, were completed. I worked for the D. M. & M. during the fall and early winter of 1881 and during 1882 and 1883 was engaged by the Houghton & L'Anse and M. H. & O. on the construction L'Anse to Houghton. I was assistant engineer on the construction. In the fall of 1883-4 I was assistant engineer and engineer in the construction of the Marquette & Western from Marquette to Negaunee and Ishpeming.

In 1884 I became general engineer of the D. S. S. & A. continuing until in 1904. I know of the building of the L. S. & I. At that time Mr. Fitch was general manager and at first vice president and afterwards president of the D. S. S. & A. I was present at a meeting between Mr. Fitch and Mr. Mather of the Cleveland Cliffs Co. when the matter of the building of the L. S. & I. was discussed. After the Cleveland Cliffs Co. had made surveys and in about 1895 I was called into Mr. Fitch's office with a map of the Marquette Iron

Range when Mr. Mather was there. They discussed the proposed route of the L. S. & I. Mr. Mather said to Mr. Fitch, as I remember:

"Mr. Fitch, if we cannot make a contract with your company on the basis that I have propored, we will build this railroad."

to which Mr. Fitch replied:

"Mather, you won't build that railroad, you cannot afford

1643 to, it is too expensive a proposition."

While I did not know the terms of the contract proposed, it related to ore charges. Mr. Fitch said several times that they were making the surveys as a bluff to get a term contract at a much reduced rate on iron ore.

I have never known of a railroad being built where the bridges were hauled across country by wagon. The usual method is to give the contractor time to put on his superstructure after the track reaches the bridge, often delaying track work a few days. The other method of building a road through a new country would be to build timber structures and carry the traffic on them until such times as the renewals were made necessary by age, wear and tear. If I were the engineer I would build my foundations ahead of the completed portion of the road as far as I could and hold track laying, or build temporary tracks over the bridges and carry my steel work to the site by rail in construction trains. For grading, through a place like Seney swamp for instance, the work would be carried on with a "drag line"; work of that character has been let within the last few years in county ditching for from 10¢ to 15¢ a yard. That would be a small portion of a line like plaintiff's. My experience has been that we could let the earth work on the basis of an earth classification for about 28¢. The allowance for hardpan would probably increase the cost 2¢ a yard. I think it could be done for that money at this time.

The plaintiff's road runs west through the Montreal Valley from 3 to 5 miles north of the Gogebic Iron Range and north of the towns of Bessemer, Ironwood, Hurley and a few other small location; Further west Ashton lies about 11.5 miles away. If I were constructing new line through that country, I should locate for the local

business, of the Gogebic Iron Range, meaning particularly the freight business. The passenger business would cut some figure also. There would be considerably more local traffic along a line so located in Michigan than along the line as now located. I am at present employed by the Michigan Central Railroad.

Cross-examination.

By Mr. Eldredge:

Nestoria was the natural place for the plaintiff to start an extension west. The line had surveys and the branch track built into Bessemer at the time I went with it in 1889-1890 and I made surveys into Ironwood and Hurley. Whoever designed the road must have considered

the question of reaching the iron ore of the Gogebic Range. Its transportation would have involved going 12 miles over to Ashland or to have found some other lake port and built a line for the purpose of shipping the ore. When the plaintiff's road was built the Gogebic Range was already served by the Wisconsin Central and the Marquette & Lake Shore. I do not know what contracts these roads might have had on the Gogebic Range but if I was building a railroad I would attempt to get where the business was offered and take my chances on getting part of it. Passengers from the Gogebic Range could reach the plaintiff's railroad via Saxon over the Lake Shore, via Marengo over the Wisconsin Central. It might have been more than a question of engineering judgment to determine the location of the road. I have been doing contracting work other than railroad work for the past three or four years. There was a marked increase in the cost of labor in 1917. I think the average price of 30¢ for grading, including hardpan, would be about right for 1913-1916.

Redirect examination:

Spurs into the different mining sections of the Gogebic Range were not built when I left the South Shore road in 1904. Passen1645 gers from Ironwood and Hurley via Marengo and Saxon would have to travel an indirect course and many miles further than if this line went in there.

1646 Elden E. Dadson, a witness for defendants, produced before the Court.

Direct examination.

By Mr. Groesbeck:

I am a public accountant. I have made an examination of the reports of the Marquette, Houghton & Ontonagon, and Marquette & Western, Detroit, Mackinaw & Marquette, the Mackinaw & Marquette, & the Duluth, South Shore & Atlantic Railways to arrive at their investments and additions and betterments from 1872 to 1917 inclusive. Defts,' Ex. 319 is the result of my work. The total investment and additions and betterments for plaintiff's entire system,

including Wisconsin, is about thirteen million dollars.

Plaintiff's report for June 30, 1917, shows approximately forty-eight million dollars in road and equipment, less about \$900 set up for depreciation; against this investment, we have found items of obvious inflation amounting to \$34,424,235.47. This is shown in the exhibit in three items, pages 8, 10 and 12, and is items charged to road and equipment account which are not properly chargeable. Page 3 of Defts. Ex. 319 is a summary of operating revenues, expenditures and net income from operation, as shown by reports to Railroad Commission from 1872 to 1917 inclusive. Page 3 shows the reported net income from operations at \$25,822,248.95.

Page 4 shows items reported as miscellaneous additions to income account of \$1,385,191.35.

Page 5 shows the reported miscellaneous deductions from income

account of \$1,294,275.99.

Page 6 summarizes pages 4 and 5, and shows a total income of \$27,207,440.30. This page shows the disposition of those earnings, leaving a deficit, as per balance sheet of June 30, 1917, of \$6,-532,151.66.

Pages 7 and 8 list various items of obvious inflation reported by the M. H. & O. page 9 showing how the first of those items is calculated.

Page 10 shows inflations from the reports of the D. M. & M. By inflations, I mean charges to road and equipment where no money or

equivalent value has been expended.

Pages 13 and 14 show, on the left hand, a computation based on the net admissible assets of the railroads, and on the right hand a computation based on the net value of the road and equipment after deducting inflations. We show the fair income from the remaining or true values calculated at the rates of interest the roads were currently

paying during the years represented.

On page 14, at the right, it will be seen that the total return on investment of road and equipment for the entire system, from 1872 to 1917 inclusive, calculated at the current interest rates, aggregates \$21,043,902.74. Calculated upon the net assets shown on the left hand of the income, at the same rate, shows \$17,195,243.30. Dividends are shown in the disposition of earnings and surplus, on page 6, and aggregated \$1,330,039.74. Allowing interest at the rates payable on their securities, upon the investment as I find it from year to year, they would have distributed \$21,043,902.74 instead of approximately thirty one million, which they did distribute, which would leave the surplus, June 30, 1917, about four million dollars.

Some of the most obvious inflations are the following: Page 8 shows bonds sold to build the road from Houghton to L'Anse, at a 50% discount, with the aggregate discount of \$464,037.90 charged to road account; page 7 shows a deficit on the books of the company, as reported to 1878, of \$562,824.66, which is charged to road account and

thus taken from the books as a deficit; page 11 shows the expense of refunding the D. S. S. & A. debt, discount, etc., in 1892, to be charged to property account in the amount of

\$4,833,108,21;

Item 1, page 11, is based upon the fact that when the D. S. S. & A. organized, their first report, in 1887, showed road and equipment aggregating over twenty-six millions. The only road the records showed to have existed in fact was the old D. M. & M., and later the M. & M. which was bought in at Receiver's sale for approximately one million dollars (\$1,010,000), and an extension of 47 miles, Soo Junction to Soo. Data obtained from the I. C. C. records at Chicago showed stock issued to promoters of the Wisconsin, Sault Ste. Marie and Mackinaw Railway of \$5,820,000, and to promoters of the Duluth, Superior & Michigan Railway of \$5,700,000, a total of \$11,520,000. As we find no evidence of these roads being in existence

we have no reason to believe any road mileage was given for this stock. The road mileage reported by the D. S. S. & A. in the same year coincides with the mileage, St. Ignace to Marquette, plus that from Soo Jet. to Soo, or about 197 miles. We believe no road was represented by the stock issued for these items, though stock was issued and a sufficient amount added to road and equipment account to balance the ledger.

The D. S. S. & A. report for 1890 shows for the first time, first consolidated gold 4½% bonds, of \$11,143,300. These were shown as being in the treasury this year and the next. In 1892, they had disappeared, and the road and equipment account, which had been shown at \$28,268,918, increased to \$42,093,666. I did not find where any money or property had gone into the D. S. S. & A. for that bond

issue.

The D. S. S. & A. had been holding the M. H. & O. under lease, and this year they claimed to have acquired title. In 1891, they had been carrying the M. H. & O. as an investment at \$6,980,532, and the M. & M. at \$1,400,000. These ceased to be

carried as an investment in 1897, accounting for about \$8,300,000. The first consolidated 4% bonds were shown of June 30, 1917, as \$15,107,000. We were not able from the reports to trace any of the

proceeds of this issue into the road.

In calculating the investment in the latter years, when a depreciation reserve is shown, we deducted the amount of the depreciation reserve shown from the property values shown by the reports of the Company. The only depreciation we have allowed is that shown on their books. In making up the investment account, it was not always possible to find the actual amount the railroad claimed to have expended in building and equipping the property; it frequently happened that the accounts shown in the table of additions to plant accounts did not agree with the increase in the plant accounts themselves. We gave them credit for all the additions and betterments reported to the Railroad Commission that we were able to find; for instance, in the D. M. & M. report for 1881, we used the cost of construction and equipment, at a total of \$2,528,963.62, shown on page 9, while the amount shown in the balance sheet was \$12,041,892.01, treating the difference, or \$9,512,928.39 as an inflation.

In the main, we accepted items of cost as reported. In cases where they were obviously overstated, we made calculations; e. g., in the case of the M. H. & O., item 1, shown on page 7, Defts.' Ex. 319, the report for 1873 states the road value at \$7,088,148.64 and equipment at \$1,077,421.26. As the road consisted of 84.34 miles, this seemed extremely high, and we made some calculations based upon Riggs'

appraisal of 1911. As a result of a computation based on 1650 \$18,800 a mile, we deducted \$5,500,000, leaving the value at

\$1,500,000 plus.

(Discussion and objection by plaintiff's counsel to the admissibility of proof of original cost at this time.)

Defts.' Ex. 319 is based upon the various reports of the plaintiff and its constituent companies to state authorities. I have attempted to analyze and digest them and deduct such items as I deemed unwarranted, calling them inflations. On page 14, the first column shows the year of report, the second column, the name of railroad reported, third column, net assets less commercial liabilities and deductions—i. e., the net assets less operating and incidental liabilities. I consider bonded debt a capital liability. From that balance I deducted the inflation. Taking the year 1917, the value reported by the company, less current liabilities, less what I claim are inflated values.

shows a net value of assets of \$6,192,609.41.

In the next column, the result is arrived at by computing interest on amount of return upon the investment. The rate of 4.5% is taken because that is the average that the company is paying currently on bonded obligations. I thus arrive at the sum of \$278,667.42 as the amount of return computed upon the value of the assets at 4.5%. On the right-hand side, the computation is made in the same manner, but basing it upon the net value of the road and equipment accounts, disregarding other assets and liabilities and deducting the same inflations, and I there find that the net value of the road and equipment would be \$13,375,591.85, and that 4.5% on that would yield a return of \$601,901.68. The column headed "Amount of Return" is arrived at from prior computations, taking 4.5% on the value of the property: the returns in earlier years were calculated at different

erty; the returns in earlier years were calculated at different rates, based upon the average paid in those years on the

bonded indebtedness.

The method adopted by me in arriving at the cost as a basis for my computations with reference to the Riggs appraisal was: The value of road and equipment, as shown in the trial balance of M. H. & O., as per their report of 1873, which was the first report in which they showed that, seemed very high, and, in conjunction with Mr. Hillman, we made some calculations based on the Riggs appraisal of the D. M. & M. and of the M. H. & O., from Marquette to Hough-We determined the ratio of cost of roadbed grading on those two lines, as shown by the Riggs appraisal, and discovered that the costs so shown on the M. H. & O. (portion of plaintiff's) lines was 77% higher than the costs on the D. M. & M. lines. Having before the cost of the D. M. & M. roadbed as shown in their report, detailed in their report of 1881, we added 77% to the mile cost as a cost of roadbed on the M. H. & O. as existing in 1873, on the theory that if the Riggs appraisal placed it at 77% higher than the other in 1913, that presumably the cost when built was approximately 77% higher than the cost of the other line for which we had the figures as reported by the road. With regard to the cost of bridges, by a similar calculation we found that the Riggs appraisal placed the per mile cost of bridges on the M. H. & O. lines at approximately 50% higher than that on the D. M. & M. lines, and having the reported cost of the bridges on the D. M. & M. lines as shown and detailed in their report of 1881, we added a mileage cost of 50% to that in arriving at the cost of bridges on the M. H. & O. That covers the method by which we arrived at the figure we have used as the cost of the road.

With regard to the cost of the equipment which we have shown in this exhibit, on page 7, item one, the detail of that was provided us by Mr. Hillman, though I checked some of it

with him, with the Riggs report and the other reports, and the detail of the calculated cost of this equipment is shown on page 9 of this exhibit. For instance, with regard to the 30 locomotives, in the Riggs valuation of 1913, he states the reproduction cost of the oldest locomotives on the line at that time, consisting of seven locomotives built in 1882, at an average cost, or cost each of \$6,916. We therefore used a figure of approximately \$7,000 on the thirty locomotives which were reported to be in existence in 1873.

With regard to the next item, five passenger cars, shown at \$13,-300; we found in the report of the road one new passenger car in 1876 and was extended out to cost \$2,736, and the five passenger cars are calculated on approximately that basis. The three baggage and smoking cars are based on a value per Riggs' exhibits, 1911, in which he shows cars number- 40, 42 and 43 at \$2,500 each, the oldest cars shown by him in that report, and we used those figures in

calculating this price.

In the Riggs appraisal, as shown in 1911 report, he shows the three oldest passenger cars in existence, numbers 40, 42 and 43,

built after 1873, at \$2,500 each.

My understanding of those figures was that they were reproduction in 1911, though I am not very conversant with the Riggs method of valuation. And as to those cars (although I do not remember the year in which they were built, yet I do remember it was later than 1873) we concluded that that was at least a liberal price at which to value the three cars that existed in 1873. The same method was followed with regard to the 28 box freight cars, the 72 platform

cars, the 476 flat ore cars and the 3 section cars. With re-1653 gard to the Harper cars shown, 1122 Harper ore cars, we found in some of the annual reports a price of approximately \$240 each on some of those cars and we used that figure. That, I

think, covers the items in the schedule.

As to the locomotives and passenger, baggage and smoking cars, to produce the value for 1873, we took Riggs' estimate of the cost of reproduction new in 1911 of the oldest locomotives he found on the line. We made no investigation of whether it would have cost more to build the car in 1873 or of the effect of the panic in 1873.

This total valuation is supposed to represent the actual cost at the

time, as nearly as we could calculate it from the data at hand.

Cross-examination.

By Mr. Eldredge:

The operating revenues shown on page 3 of Defts.' Ex. 319 for the M. H. & O. from 1872 to 1887 at \$12,000,000+ are as reported by the company. I made no adjustment of those. The information was taken from the reports of the company to the Railroad Commissioner and Railroad Commission. That is true of all the compilations I have made. The operating expenditures are also as reported by the company. We made an analysis of the miscellaneous additions to and deductions from income account, as shown on pages 4 and 5

of Defts.' Ex. 319. The taxes were taken as reported, except for 1872 and 1873, where we applied the same amount as shown for 1874.

We accepted the operating revenue, expenditures and income as shown for the Marquette & Western, as reported. Our purpose with respect to the income was to make a comparison of the actual income as reported with what seemed to be a fair income or return on capital investment, as shown on the final table of the exhibit.

Apparently, the M. & W. for 1884, was operating at less than 50% of expenses to revenue. We did not go beyond the reports, or study whether they had maintained the road properly or whether there were omissions of proper charges in operating income. The D. M. & M. was operated but one year (1886) as the M. & M. The operating revenue for 151.9 miles of line was \$58,000, operating expenses \$47,000, and operating income \$21,000. We had no information to determine whether the report was accurate or not and included all the items of expenditure, but took them as reported. The item on page 4, Ex. 319, "Balance left over for construction in 1883," appears in the inflation table as item 2 on page 10. The report for 1883 shows increases in property account, road and equipment, \$279,468.48, and an increase of \$250,000 not accounted for. We do find that this increase of \$250,000 is offset by items referred to as miscellaneous additions to income account. This is our analysis of the report. We included this \$250,000 as a part of the inflation we found. The item, page 4, "Received from the Land Department, Trustee, 1883, \$23,625.20," we treat as a part of the income of the road, and it is included, not as operating income, but as an addition to income.

The return shown on page 14, Defts.' Ex. 319, is not a statement of return as reported by the railway company. The \$21,043,902.74 shown on page 14 is what we calculate is a fair return on the investment in road and equipment, after deducting inflations, at 4.5% interest, or other rates which were currently paid on funded debt. In earlier years, they paid higher rates of interest. We did not go

back of the reports beginning with 1872.

I was trying to find out the amount actually invested in the property. I thought it a fair way to take the estimated value in 1655 1871, without reference to time of construction. It did not enter my mind that it was impossible to do what I was attempting to do with the data at hand. The plan was devised mutually between Mr. Hillman and myself. The item of about \$8,000,000 seemed excessive for 84+ miles, and we made comparisons with the

appraisals.

I did not learn that the M. H. & O. to L'Anse was built to earn a land grant. There was a sale of approximately two and a half million dollars of lands at one time. It is shown in item 4, page 7. We observed the book value assets were not decreased, although this land was evidently disposed of; we found that they had decreased their liabilities by applying \$2,000,500 to the payment of mortgage debts. It would not necessarily follow that it decreased the assets used in public service. It would not decrease them at all. It might have been a good proposition for the M. H. & O. to sell those lands at that

time, though they did not get the market prices that might prevail in later years. I had the justification for the insinuation that the assets were stated greater than they should be, in that the road showed certain assets on the balance sheet, and having disposed of some of them they showed no decrease. They already showed decrease of liabilities, though the disposal of the property for liquidation of liabilities would not necessarily make any difference in the net worth ef a corporation, but it should show a difference in the total assets, which, in this case, it did not. Referring to discount on Houghton and L'Anse bonds, item 6, page 8, while it might under certain circumstances be a justifiable proposition to sell the bonds at 50¢ on the dollar, it is not proper to charge a discount of that kind to property account. Discount on bonds is usually amortized during the

life of the bond as a charge against the operations of the years 1656 during which the bonds live, and is not properly chargeable

to property account.

I treat the discount as an inflation because it is charged to property account improperly, while it is an expense item which should be

absorbed during the life of the bonds.

The reports with regard to land sales, the information was very meagre, and all the information that we could obtain from them was that lands were sold at different times for a certain net amount of money. It seemed that in taking credit for those sales the charges for taxes and other legitimate charges against the lands were deducted and the net amount shown in the reports.

In our analysis of miscellaneous additions to and deductions from income account we included all items reported as additions to or deductions from income. We obtained this information from the re-The items of inflation were obtained from a study ports themselves.

of the reports.

We obtained some information from Mr. Hillman; that which refers to the first item on page 7, the value of the M. H. & O. as shown When I referred this item of the valuation to Mr. Hillman, in 1873. he directed my attention to these appraisals and assisted us to find a ratio that seemed to establish a fair price for the road, as shown on The only information as to the fifteen odd million doilars of bonds issued to the Canadian Pacific, and the 4% bonds of the plaintiff, was that they were shown as outstanding in the annual reports at the end of each year.

I now know the plaintiff to be the owner of the M. H. & O. There is nothing in the investment of the plaintiff that represents the cost to it of the M. H. & O. The report of plaintiff shows a value of road and equipment and their ownership of the M. H. & O. 1887 to

1880, as an investment, and the acquisition of the title in 1891, 1657 and in the next report they show an addition of about \$14,-600,000 to road and equipment accounts. It was our duty, as far as possible to find what the M. H. & O. investment was, but there was no data given us in the reports to show that, and we never went outside the reports.

I presume that upon a letter from the Attorney General the plaintiff's officials would have given me access to their books, but I was not so advised. We made no investigation to determine what plaintiff paid for other railroads it acquired. The only thing we were able to do from the data at hand was to determine, as far as possible, how the values were made up. When the plaintiff was organized, it issued capital stock of \$22,000,000, showing \$325,000 of equipment and the rest in road account; of that \$22,000,000, we know about \$12,000,000 was issued to the promoters of the consolidated roads.

I am not an engineer, but I feel bound to use good business judgment as to fair accounts. In making up accounts, we do not accept

figures regardless of how absurd they may seem.

The roads taken into consolidation showed no good will account or anything of that kind, and, of course, we were not called upon to

investigate it.

Pages 13 and 14 of Defts.' Ex. 319 show a decrease in net assets to approximately \$6,000,000 in 1917, and an increase in net value of road and equipment to approximately \$13,000,000 in 1917, the decrease being caused almost wholly by continual book losses showing a decreasing net worth.

As shown by their books, the company was losing money all the time. The fairer deduction, and the most liberal one to the railway, is on the right hand side of the page, where we show an allowance of an income equivalent to the income on bonds on their invest-

ment in road and equipment. This is the computed income mathematically fixed by me. These figures are all based on the figures presented by the railway company itself, deducting only those items considered obvious inflations, and the investors then allowed on a fair basis the rate that the bonds paid, and if they obtained that rate on the investment they would have obtained, 1872 to 1917. \$21,000,000 plus.

We considered that would be a fair return. If the road was worth \$10,000,000, bonded for the same amount, it would belong to the bondholders, practically. It would be clear the stockholders had no investment in it, regardless of whether they paid more for it or not.

The purpose of Defts.' Ex. 319 is twofold, first, to refute the claim that there is a deficit of \$6,500,000 in the operations of this road, and second, to show the value of investment in road and equipment. The sole purpose of computing the interest or amount of return is as bearing upon the deficit.

1659 CLEMENT C. WILLIAMS, a witness for defendants, produced before the Court, Nov. 1917.

Direct examination.

By Mr. Groesbeck:

I am and have been connected with the University of Kansas, as professor of railway engineering, for four years. Previously, I was assistant professor and later professor of Civil engineering at the University of Colorado. I have had actual experience in engineering work connected with railroads for about six years, with the Delaware, Lackawanna & Western, the Chicago, Milkaukee & St. Paul, and the

Illinois Central, in the engineering department. I am a graduate in

civil engineering of the University of Illinois.

I have done research work pertaining to the problems relative to track maintenance in connection with my work at the University of Colorado, and more particularly in connection with my work at the University of Kansas; that has extended over a period of about four

years.

My attention was first called to the matter of stresses in track, and the effect of traffic on track, by observing some broken angle bars lying alongside of the Colorado & Southern Railroad, and I took those into the laboratory and made a careful examination and observed they were fatigue failures; the steel had failed by fatigue rather than by being over-stressed; that is, rather than by stress beyond the ultimate strength of the material. I made a further investigation of the subject in which we put a scientific apparatus on the track and measured the deflections of the track under traffic; the stresses in the rail due to the presence of traffic. For the purpose of measuring the deflections of track under traffic, we devised a Traffic Deflectograph.

1660 (Question raised by counsel of the right of defendants to produce proof of the effect of traffic on track at this point in the case, it being claimed that additional proof could not be put in. The proof was admitted as applying to the division of accounts 1914-1917 inclusive and as applicable to theories previously or subsequently advanced.)

My work m of research was not connected in any way with any issue or trial between railroads; it was carried on as a scientific research in connection with scientific studies of the University, purely for the purpose of furthering the knowledge of track maintenance,—

the science of railway engineering.

The first piece of equipment that we used, as we call it, the track deflectograph, was a device we constructed at the University for measuring the deflection of the track under the passage of trains. It consisted of a framework of pipe anchored entirely outside the roadbed, to which were attached four cylinders, which could be rotated and which carried sheets of paper on which a record was made. A pointer attached to the rail made a mark on the upper part of this paper chart as the rail was deflected, recording exactly to scale the deflection of the track. At the bottom of the chart was a secondary pointer which indicated by means of electric contact the position of the wheel with reference to the diagram that was being made at the top, so that it was possible to relate or connect up the diagram that was made by the deflection of the track with the position of the train wheels at any time. That gave qualitative results largely rather than quantitative.

The second piece of equipment we used is a commercial equipment called the Berry Strain Gauge. It is used generally by all of the scientific laboratories throughout the country, Universities and other places, for measuring stresses in any piece of material

when it is under load. This is attached to the flange of the rail and enables one to read the stretch or the deformation of

the rail exactly. The two pointers at the bottom of this equipment are inserted in small holes in the flange of the rail and 8 inches apart, and a dial which is about the size of the face of a large watch, has recorded on it by the pointer there the amount of stretch of the rail in that 8 inches, and from that stretch or deformation it is possible very simply to calculate the stress in the rail, because a steel rail is a piece of ciastic material and it is possible very simply to calculate the stresses in such materials, This piece of equipment was used for getting what I might call quantitative results, that is, actual stresses in pounds per square inch in figures.

Most of the observations were made on the Santa Fe Railroad, near Lawrence. A number were made on the Union Pacific, a few on the Missouri Pacific, and quite a number on the Interurban Railroad, the Kansas City, Kaw Valley and Western. We took these latter observations for the purpose of finding behavior of the track under trains which were not puiled by a locomotive, that is, under the cars them-

selves.

I supervised and was present at practically all of those investigations and tests; all of the blue prints are contained in Defts.' Ex. 320,

lettered from A to Q, omitting J.

Sheet A is a chart taken by the deflectograph and shows the deformation, the depression of the track under a passenger train, which was operated over the apparatus at 40 miles per hou. There are four charts on the sheet and each one of these was taken

by one of these cylinders that I spoke of, which was located at the middle of the rail; gauge number 4, near the joint and gauges 2 and 3 were at the intermediate points on the rail; so that the record is the entire half of the rail as the train passed over it. The dots down below indicate the position of the wheels and I have interpreted the mean of those dots by sketching in conventionally the wheels above.

Charts B, C, and D are similar in general purport, although somewhat differently drawn up, inasmuch as the interpretation of the wheels is not shown, but from these charts which represent passenger trains operated at various speeds I drew the conclusion that the deflection was not increased under trains operated at higher speed. The deflection or depression of the track was not increased by virtue of the greater speed of the trains. The speeds are indicated on the

chart, varying from 25 to 52 miles per hour.

Chart E is taken by the same apparatus, but under freight trains. It shows particularly an interesting observation, and that is that here is a tremor in the track under freight trains that does not exist under passenger trains. This is probably due to the eccentricity of cast wheels as distinguished from turned steel wheels, as will be shown by a chart later in the exhibit. That is shown by the very small waves in the line. The major waves or vertical movements of the chart indicate the general depression of the track, whereas in addition to that general depression of the track there is secondary tremor in the track due to a vibration apparently, and that is indicated by the small vibrations, or the small waves, we might call them.

On Chart F, I have scaled off the actual deformations from there

preceding charts and from others, of which these are typical, and platted these deformations against speed and those show what I stated awhile ago to be true, that the deformation is not increased by virtue of speed under the same two of equipment.

The speeds of freight trains are nowhere here shown.

Chart F refers only to passenger cars of the same type; not to the locomotive at all. Chart G is platted in a similar way to chart F, but refers to the depression of the track under the locomotive, scaled under the chart, made by the rear driver of the locomotive, and the trailer. The trailer is, as well known, the wheel following the drivers and supports a load practically the same as the drivers, but it is merely a supporting wheel, not used for driving the locomotive.

The upper figure in chart G is one type of locomotive; the Pacific or Sante Fe type, 3500 class, all of the same weight of locomotive; and the lower figure on chart G refers to the 1400 class, or Atlantic

type of engine, all of the same class,

Chart G shows, incidentally, the difference in deflection under the

driving wheel and under the trailer.

The scale of deflection in inches is indicated at the left. In the upper figure the deflection of the trailer is twenty-five hundredths of an inch from the normal position of the track; the track is pressed down twenty-five hundredths, or ¼ of an inch under the trailer and a little more than that under the driver. The figures, .300 and .200, at the left, merely indicate the scale of the chart. The distance between the 200 and the 300 represents just one-tenth of an inch. The position of the top rail if there were no weight upon it, is not indicated for the upper chart nor for the lower chart, it would be somewhere below the bottom of the sheet.

The actual deflection is indicated, the amount being indicated at the left in figures, that is in the upper chart the deflection of the trailer is uniformly twenty-five hundredths of

an inch. It is half way between two tenths of an inch and three tenths of an inch, or a quarter of an inch. The reference line is not shown on the chart, but the amount of deflection is shown at the left in figures and it is drawn to scale, and the same is true with the lower chart, the deflection of the trailer, uniformly twenty-two hundredths of an inch, does not vary with the speed, the actual amount of deflection being shown at the left margin of the diagram, of the coordinate.

Those figures at the extreme left show the scale of the diagram and aid you in measuring the deflections shown on the diagram.

Chart H represents the stresses obtained by the Berry Strain Guage, the second piece of apparatus which I described, and these are actual stresses under passenger traffic operated at various speeds. It is shown there that the stress does not increase with the speed.

As a matter of fact the observations that are there platted which constituted all that I had of that series, really show a decrease in the stress due to speed, but I have indicated there in a broken line, a dotted line, what the probable average curve would be if more observations had been taken. It will be observed that at 60 miles an hour and at 40 miles an hour there was only one observation taken. If

more had been taken I should have expected them to be distributed somewhat as they are at the lower speeds, which would make the curve more nearly horizontal, as will be shown in another curve that I have here. When I say stress, I mean the actual strain in pounds per square inch. In this case, it was exerted horizon1665 tally, the pull on the bottom of the rail, tending to rupture

the rail in tension by pulling it apart at the bottom.

Chart H literally interpreted, would show a decrease in stress with an increase in speed. That fact is not in harmony with other observations that we have taken, and so I drew a horizontal line, labeling it the probable average curve, if more observations had been taken, because our other observations did not show a decrease in the stress; neither did they show an increase in the stress, although this particular set does show an increase (Decrease) but I think it is due to the fact that we have so few observations in this series around 60 miles an hour. If there had been more at that speed, they would have been scattered, probably, and would have raised that end of the

curve.

Chart I represents a similar graph or plat of stresses under electric interurban cars, all of the same type. I made arrangements with the general manager of this interurban railroad to operate the cars over our apparatus at various speeds, as we should indicate to the motorman, and we found in this case also that the stress in the rail did not increase in a general way with the speed, the speed apparently having practically no influence on the stress. These points are scattered, as one might expect, because the exact stress depends on the lurch of the car as it happens to pass the equipment, but the average curve does not show an increase in stress with the speed. I have other charts here, showing records of other experimenters, made independently for other purposes, which corroborate the conclusions that I drew from the test that I made myself. The remainder of these charts represent the results of these other experimenters.

Chart K is a record made by the Committee on Iron and Steel Structures of the American Railway Engineering Association, an association of engineers, and represents a part of the results

in particular is more easily understood in this, because it brings out the point more distinctly. In order to explain this, it is necessary to say a word about the counter-balancing of locomotives. In explanation: a freight locomotive is counter-balanced for the speed at which freight trains operate; a passenger locomotive is counter-balanced for the higher speeds, that is, for the speeds at which passenger trains are supposed to operate. It will be observed from the chart, with this in mind, that the passenger locomotive does not cause a large increase in the stress in the rail until a certain speed has been passed, approximately that speed for which the engine was counter-balanced, but that the speed for the freight locomotive causes an increase in stress because the freight locomotive was counter-balanced for a lower speed; as a matter of fact, under 58 miles an hour in this case, the increase in stress due to speed, that is, due to

impact, was the same under the passenger locomotive as under the freight locomotive at 20 miles an hour, and that conclusion was made by the Committee and can be found in the proceedings.

rived at that same conclusion.

Chart L represents the effect of impact due to counter-balance on locomotives that are counter-balanced for passenger train speed that are well adjusted for operating at passenger train speeds, and they show that under about 48 miles an hour for steam locomotives the effect of impact did not exceed in any case here about 8%. lustrate the fact that the increase of stress under the locomotive is due to improperly adjusted counter-balance, and that is entirely in harmony with the conclusions that we drew with regard to the stresses under cars where there is no counter-balance; that is, that there is

no increase in stress.

Chart M represents the results obtained by a series of ex-1667 periments carried on under the direction of Dean Turneaure, at the University of Wisconsin, showing the effect of impact at various speeds, when the effect of counter-balance has been eliminated, and Dean Turneaure's conclusion, as quoted in the transactions of the American Society of Civil Engineers, is to the effect that speed in itself does not increase the stress in the bridge, but that the increase that does result from higher speed comes from the counterbalance.

Chart N shows the relative effect of passenger trains and of a freight train passing over the same bridge, the passenger train at 40 miles an hour and the freight train at 28 miles an hour. This is an actual chart that was traced by a pointer attached to the member of the bridge as the train passed over it. It illustrates the fact that the freight train causes an intense vibration, which is not apparent or which does not appear in the passage of the passenger train, and that was a conclusion which Dean Turneaure drew from his tests.

Chart O shows the results of the Committee of American Railway Engineering Association appointed to investigate the effect of flat wheels on track and track structure. At the left is shown the actual amount of stress in pounds per square inch, while at the right of the chart the scale indicates the per cent of increase of the stress due to This test was made by loading a freight car of 80,000 pounds' capacity and operating it with two flat wheels. I mean by a flat wheel a wheel with a flat spot on it, such as frequently occurs in freight train operation. The flat spot was 21/2 inches long, and that is the amount of flat spot allowed by railroads before the truck is

removed from service, theoretically; as a matter of fact, flat spots very frequently occur that are much longer than that 1668 before the truck is removed from service, but that is the specification, and this chart shows that under certain cases the impact due from a flat spot two and a half inches long may increase the blow to the track or the pressure on the track seventy-five per cent of

the normal. I made a similar test in connection with the work that I spoke of a while ago, and found a 50% increase, which is in accord with this.

Chart P shows a series of observations made by Mr. West, a foun-

dry expert, and reported in the American Society of Testing Materials on the rotundity or the evenness of cast freight car wheels; the deviation from a perfectly round wheel is exaggerated in the chart, but the figures are exact, so that they represent the exact amount. These were of new wheels, twelve of them taken at random, representing the product of several different manufacturers; no one of these was perfect; and the author of that investigation concluded that very few cast iron freight car wheels are perfectly round. It will be observed that as high as four hundredths of an inch in radius, and in one case as high as seven hundredths of an inch in diameter was observed as a maximum variation from a perfectly round wheel in a new cast iron wheel, and in that connection it might be worth while to mention that steel wheels such as are used under passenger trains commonly have a maximum variation of two thousandths of an inch, or about one twentieth of that amount.

Chart Q illustrates the effect of wear on the drivers of freight and passenger locomotives under various lengths of service. It is a well known fact that freight locomotive drivers wear rough much more readily than do passenger locomotive drivers, because of the more slippage; they pull a larger per cent of their capacity consequently

the wheels slip more and the wheels wear rough.

In the sixth chart or diagram on this chart is shown the record of a passenger locomotive that had been run sixty thousand miles. I might say in explanation of this that the straight line represents a developed circle and the wavy line represents the contour of the locomotive driver referred to that perfect circle, or, in other words, the deviation from perfect rotundity, and this chart shows that a passenger locomotive, even at 60,000 miles total run, may be almost perfectly smooth. The one shown in diagram No. 1 is not perfectly smooth, but none of the passenger locomotives, even though the run exceeded that of the freight locomotives, was as rough and uneven as the freight locomotives. Those

I have, this fall, about two months ago, measured some of these wheels on freight cars, myself. I used a templet turned in the lathe to the theoretical surface of a freight car wheel, and applied that templet to a large number of freight car wheels that were standing on yard tracks at Lawrence. That was not for the purpose of this case. I found that at the present time a very large percentage of the wheels of freight cars are rough, the largest percentage of rough

wheels occurring under coal and gondola cars.

are all of the charts.

Under grain cars I found that 7% of the wheels were flat, the length of the flat spot being one to three inches; under stock cars 16 percent of the wheels showed flat spots, varying in length from one to two and a half inches; under coal and gondola cars 20% of the wheels showed flat spots, varying in length one to three inches. I made a study of the wheels under ten passenger coaches and none of them showed any flat spots at all. There was absolutely no comparison between the condition of the wheels on the passenger coaches and the wheels on the freight cars.

In brief, the spring system of a freight car is more inelastic, under heavy load is almost entirely compressed, so that there is very left additional spring available, while under a passenger coach, where the load is not very great, that is, the live load being a small percentage of the total gross load, the springs are always in a condition to be compressed further, so that the shock absorbing capacity of freight cars, particularly when they are loaded, is very small, while the shock absorbing capacity of springs under a passenger car is always large, that is, they will readily absorb a shock, and

not strike a blow to the rail.

A six wheel truck always has at least two of the three wheels resting on the same elevation, that is, one of three wheels may drop into a depression in the track, say at a low joint, and the other two of the three will support the truck. In the two wheel truck, that is not the case. When one of the two wheels drops into a depression in the track, it allows the entire car body to drop, but that is not the case with a passenger coach; the car body would not drop, would not be lowered at all when one wheel would drop into a slight depression in the track, because the other two wheels of the truck, of the set of three, would support the car body.

The effect of this continual hammering which I have spoken of caused by freight traffic is most apparent at the joints, in hammering down the joints and causing low joints. It is also manifest in pulverized ballast and in causing the roadbed to be worked up into the ballast, causing the ballast to require cleaning or renewal. It also pounds the ties to pieces, brooms the ties, as it is called. The ties are compressed and gradually mashed and destroyed under the rait, due

to the continual pounding of the passage of wheels.

The rail itself is also injured. Most rail failures I might say result from imperfections, that is, they occur at imperfections in the rail, and flat spots of freight car wheels cause the failure to occur whenever one of these flat spots happens to strike an imperfection in the rail. If the rail were perfectly sound, most all traffic would be carried over without breaking the rail, but

most all rail failures result from the fact that these flat spots and irregularities of the wheel seek out, you might say, the imperfections

or defects in the rail, causing the rail to fail—to be broken.

These studies seem to show that the damage done to track by the passage of train is primarily due to the weight and in proportion to the weight of the traffic passing along the track and that the speed of the traffic is not an important factor, that the damage is not appreciably increased due to the speed of the traffic. In continuation of that answer I will say that we observed that the stress was in proportion to the weight, whether the traffic was locomotive or a car, that is, it was in proportion to the weight, one ton of weight of locomotive caused essentially the same stress and damage that one ton of car did, leaving out the effect of impact, which is slight.

So far as the operation of passenger trains is concerned, the chief object in superior maintenance is promotion of safety of operation, because a passenger locomotive is not taxed to its utmost to pull its

train. It could always pull a heavier train than it does pull at a

lower speed, if necessary.

The object of superior maintenance, so far as freight operation is concerned, is to decrease the tractive effort, or to decrease the tractive resistance and thereby allow the locomotive to pull a heavier train load. The upkeep of tracks that are used in common between passenger and freight traffic is dependent more or at least as much on the desire to decrease train resistance as it is upon the desire to pro-

mote safety of passenger train operation.

Suppose you have a freight train and the wheels are flat, or flattened; every time that wheel revolves, when the flattened part of the wheel comes in contact with the track, there is a blow delivered to the rail. That blow is not greater at a higher speed. The blow diminishes at the higher speeds, at speeds above 23 or 24 miles an hour, because the wheel turns so quickly that the car does not have time to drop down and strike the blow. That that is a fact, is a matter of common observation, and has been well established by laboratory experiments made at Purdue University.

"The Court: Suppose you enlarge the wheel to two or three times its diameter and then increase the speed, would you get a greater

blow?

A. Yes, with the increased speed you would get a greater blow if

the car body has time to make the drop.

The Court: The drive wheel of the locomotive has its counter-balance; isn't there a blow every time that part of the locomotive strikes the track?

A. There is some blow.

The Court: The locomotive wheel, and the size of the driver on the locomotive is, particularly on a passenger engine, of times three times what the size of a freight car wheel would be, isn't it?

A. About two and a third times. The diameter of a freight car wheel is standard 30 inches and passenger locomotive usually about

70, varying a few inches from that.

The Court: Take the same weight of locomotives, wouldn't there be a difference between 15 miles an hour and 60 miles an hour in the impact of the driver?

A. With the same locomotive, yes sir.

1673 The Court: Well, it appears in this case by the proofs so far that some of the heaviest engines on the road are passen-

ger engines. Wouldn't that make a difference?

A. The passenger engines, your Honor, are adjusted. The counter-balance is adjusted for operation at the higher speed. There are two factors entering into the counter-balancing of locomotives; one part of the counter-balance, that is the added weight on the wheel, is to overcome the effect of the crank pin; that is, where the connecting rod is attached to the driver, to balance that. That part could be balanced exactly.

The Court: That would be like on a stationary engine?

A. It may be.

The Court: You use a balance wheel to overcome the inertia on the strain?

A. Yes, that is essentially so.

The Court: On a single cylinder engine there would be a dead

center that you have got to go by each time?"

On a stationary engine, there is a shake back and forth of the engine, and traction and steam engines show that the engine jars back and forth. That jar back and forth is due to the movement of the reciprocating parts of the engine; that is, the piston head and the part where it is connected to it; they shake back and forth, because every time the piston goes forward it has to stop, and that causes the engine to lunge forward. Now, this second part of the counterbalance of the locomotive is designed to prevent just that thing in the locomotive, to prevent that shaking back and forth due to the reciprocating parts, and the adjustment of that is dependent upon the speed. Locomotives have their counter-balance adjusted to a particular speed. Freight locomotives have it adjusted for low

speed; that is, speeds at which freight trains are supposed to 1674 operate, and passenger locomotives have the counter-balance adjusted for higher speeds; that is, speeds at which passenger trains are supposed to operate, and until the speed is exceeded for which the counter-balance is adjusted, there isn't a very great effect on the impact. Obviously, if a freight train is operated at high speed, inasmuch as it is adjusted to be operated at low speed, there would be a high impact; that is illustrated by all of the observations that have been made on the subject. It is true, theoretically, and it is true from experimental results, and those charts which I have submitted here, show that if your passenger train exceeds the speed for which the locomotive was adjusted, with respect to the counter-balance, there isn't a large impact. In fact, the chart shows that the impact under a freight locomotive at 20 miles an hour was the same as the impact under a passenger locomotive at 58 miles an hour, due to the fact that they were counter-balanced for different operating condi-

"The Court: Is it wholly due to that, or is it due to the fact that freight locomotive was drawing the heavier load and running at the lower speed, which offsets the higher speed and the lighter load of

the passenger locomotive?

tions.

A. This result, I believe, was obtained by a test taken where the train was essentially the same, a train especially made up for that purpose, the only varying factor being the locomotive. A train of the same weight was taken. Those were tests made by the Committee of the American Railway Engineering Association. The engine was the only factor that was charged. There is a slight wave of the track preceding the locomotive. We have found that to be the case. It isn't always noticeable, I might say, and I can't

say under what conditions it is and under what conditions it is not, that is, what explains it, but it is noticeable in some cases and in other cases we do not notice it. A wave doesn't cause a high stress in the track, but there is a slight wave in some cases.

The Court: Would there be any difference in the lateral strain upon the track, say, upon a curve due to the higher speed?

A. We made at the University of Kansas some tests along that line, and we did not find any marked increase due to the speed, although our tests were rather inadequate; and it is a fact, been found, I believe, by some observers that there is a slight increase on curves due to speed, but not on straight track. Our observations, I might say, were made on straight track for the most part, although we attempted to find the result on curve, but not very successfully.

I would make one statement, your Honor, in connection with this effect of speed. It is a matter of common knowledge, scientific knowledge, that a slowly applied load causes a greater stress than a rapidly applied load. That is a statement, and experiments can be found in

almost any test book on mechanics to substantiate that.

The Court: If the rapidly applied stress or suddenly applied stress is compared to the slowly applied stress, wouldn't there be greater

liability to breakage?

A. For the same amount of load, it is not so. I can illustrate it in a rather crude but anomalous way: A phenomenum one observes, if he touches a hot iron with his finger; if he holds it there a long time,

he will be burned; if he touches it and removes it quickly, he will not be burned; that is an analogy, aithough it isn't an exact perellel but the case about 16.

exact parallel, but the same phenomenum occurs. It takes a certain interval of time, and if the load is applied only a fraction of the time required for the transmission of the stress, the whole stress will not occur.

The Court: In other words, if you had a screw pressure brought to bear upon, we will say, a steel rail, the rail would not break or bend any quicker or any slower with that kind of pressure, *that* it would if the same pressure was exerted by dropping a weight upon it?

A. The dropping of a weight, Your Honor, is not quite analogous, because we are likely to confuse the effect of the drop with the actual

pressure blow, with the actual load applied.

The Court: No, I mean the combination of the force and the

weight produces the same pressure upon a rail?

A. The quicker blow will cause the less deformation. I will just give a laboratory experiment along that line, and I think it will make it clear.

In this laboratory experiment, a wrought iron bar was put under a load of 1,600 pounds, and it gave a deflection of .480 of an inch; that is a little less than half an inch, when it was applied one minute; and when it was applied three minutes the deformation was .632 of an inch, an increase of 29% in the deformation with the same load for three minutes instead of one minute, and in another case a bronze bar gave an increase of 13½% when the load was applied five minutes instead of one minute. In the case of zinc, the tensile strength more than doubled by increasing the speed, and Fisher proves similar results for tin.

The Court: I suppose that is somewhat upon the same principle that if you skate rapidly enough over thin ice you can

go over without breaking?

A. It is the same principle exactly. It is a matter of common knowledge in mechanics, and I have references here to a number of text books, if it is required to give them.

Cross-examination.

By Mr. Tracy:

I am 35 years old, graduated from the University of Illinois in 1907, and had railroad experience both before and since. My experience consisted generally of maintenance, construction, designing, and work on location. The work on maintenance and location was on the Scranton Division of the Lackawanna, in 1905, 1906 and

then in 1907.

I started my experiments in the fall of 1913, and have been working on some of them all the time, until this fall. My preliminary investigations were published in the Railway Age Gazette in July, 1915. I testified in the Missouri Pacific Rate Case, at Omaha, Nebraska, in October, 1917, on behalf of the state. Defts.' Ex. 320 represents my own experience and data taken from charts of experiments by others. The data on page K is from the same source as on L—from volume 12 of the American Railway Engineering Association proceedings, in 1912. By "deflection of rail" I mean pounding down on the rail. The deflection I measured was the temporary pounding down of the rail from its normal position. By the expression, "stresses," I mean the result of an action inside the material, which is the result of a load, this action tending to rupture the material.

Etress results from, but is not necessarily — proportion to, the deflection, though they are coexistent. I measured the vertical deflection, and the stress spoken of was that resulting from

1678 vertical deflection of the track. I testified only to deflection and stress of the rails, though we attempted observations on the stress of ties as well. While not altogether satisfied with the results for ties, there was nothing that showed anything different than the tests on the rails indicated. We used the same device, in a

siightly modified form, for getting the deflection of the tie.

I said 2.5 inches was the limit of flat spot that the Master Car

I said 2.5 inches was the limit of flat spot that the Master Car Builders' Association specifies before the car is removed from the service. They run them up to that. As a matter of fact, the effect of flat spot has been definitely proved by laboratory experiments to vary as a third or fourth power of the length of the flat. The experiments are not sufficiently complete to demonstrate fully whether it varies with the fourth power or the third power, but it is somewhere in there. Now, if the effect is the fourth power of the length of the flat, then a flat spot of 2½ inches long, which is the maximum allowed on a freight car wheel, will strike a blow 39 times as great as a one inch flat spot, which is allowed on the passenger car wheel; and if it varies as the third power, or the cube,—the two and one-half flat spot on the freight car wheel will strike a blow 15.6 times as great as the one inch flat spot on the passenger car wheel, operated, I am assuming conditions the same in other respects.

The Master Car Builders' Association limits the flat spots on passenger car wheels to one inch. As a fact, the rigid inspection to which passenger coaches are subjected much more nearly secures that

specification than does the rather lax inspection of the two and a half inch flat spot on some freight car wheels. I found one flat spot in this investigation that was over six inches long, for example, on a coal car, on the Union Pacific Railroad, in a a train on the main line, ready to be moved out of the station. So it is ob-

vious that the flat spots on freight car wheels do exceed the

two and one-half inch limit frequently.

The flat spots are more dangerous in cold weather, the commonly-ascribed reason being that the roadbed, being frozen, makes the blow more nearly like the blow of an anvil, on a solid base; there is no compression or resiliency, or give, under the track, and the result is more serious.

A break in a rail from a flat spot comes from what you might call the blow. So far as the rate of application of the load is concerned, the speed of the train is immaterial as to the stress which is caused upon any portion of the track. Experiments have shown that the effect of flat spots diminishes with the increase in speed. I cannot say that to avoid danger from a flat spot they should increase the speed rather than issue a slow order. There may be other causes entering into it, but, so far as the effect of the flat spot is concerned, the effect actually diminishes with the increase in speed. Primarily, though not entirely, the maintenance of track to a certain state of perfection is, as far as the passenger is concerned, for the safety and comfort of the traffic.

Redirect examination.

I think there were two points that came up in connection with my statements this morning that may not have been perfectly clear; one relates to the effect of the counter-balance of the locomotives as compared with the effect of a flat spot on a freight car wheel or any other wheel. They are not similar. The effect of the counter-balance on the locomotive is merely to increase and decrease periodically the pressure on the track; it is not in the nature of a blow; whereas, the

effect of a flat spot upon a wheel is a distinct blow as the weight

1680 of the body of the car comes down on to the track.

One other matter I should like to make a little clearer is that the effect of the traffic going over a bridge is very different from the effect of the same traffic over a track that is lying on the ground. Certain of these exhibits refer to tests that were made on bridges, and the tests that I made myself relate to the track itself as it lies on the roadbed, and that matter might not be perfectly clear. A bridge is a whole structure, and each member of the bridge is free to vibrate to a greater or less extent. A bridge is supported at two points, at the ends, and is, in a way, like an immense fiddle-string; it can vibrate. And the members of a bridge are similar, the chords and the diagonals and all the members are not supported at intermediate points, but are supported at the ends, so that they are free to vibrate. Now, as a locomotive passes over a bridge, the effect of the counter-balance on the locomotive will depend very largely upon the vibration of the bridge in time, or in consonance, which is the scientific term-in tune you might say, with the period of rotation of the wheel; that is, if the

bridge, or the mem'er of the bridge, vibrates in time with the rotation of the wheel, the effect is cumulative, and so the stress is much greater than it is if there is no vibration. Now, the large effect of the counterbalance on bridges which has been observed in certain cases, is due to the vibration, and not directly due to the increased pressure of the counter-balance. The counter-balance sets up a vibration in the structure, and the weight of the structure itself vibrating really causes the increased stress, and not the direct pressure caused by the counterbalance. Those were the two points that I think were not quite clear.

EDMUND J. KATES, a witness for defendants, produced 1681 before the Court, Nov. 30, 1917.

Direct examination.

By Mr. Groesbeck.

I reside at Lincoln, Nebraska. I am a mechanical engineer, devoting my time exclusively to studies relating to railway equipment and correlated subjects. I was from 1901 to 1909 with the Burlington on its lines west, in Nebraska, starting in the supply department; I was then transferred to the mechanical department and given two years as piece work inspector and foreman in the freight car shops, one year in the main drafting office, on equipment design, two years as shop engineer, in the passenger shop at Plattsmouth, and two years as shop engineer in the locomotive shops at Havelock, with a portion

of a year as assistant shop improvement engineer.

From 1909 until 1914, I was in the engineering department of the Nebraska State Railway Commission, first as mechanical engineer and then as principal assistant engineer. During all that time, I had charge of the inspection and appraisal of all the equipment on the steam railways in Nebraska, my chief duties being the collection of data relating to the cost and depreciation of this equipment, and during that time I was also chairman of the Equipment Committee in the Association of Valuation Engineers, among the various commissions of the states, in which capacity I had charge of the collection of equipment cost and life data for the several states west of the Chicago line.

I was on the lines of the plaintiff several days, and inspected quite a considerable portion of the equipment. I inspected some of each of the several types of equipment they have on their line. I made myself familiar with the kind and character of equipment, as to loco-

motives and passenger and freight cars.

I have a copy of the exhibit of Mr. Fowler (Pltf.'s Ex. 211-214) which contained a list of the equipment as to quantities 1682

in the different series and numbers of the series. I am able to estimate the present value of that equipment. The present value that I have attempted to obtain represents the remaining serviceability in the equipment as it exists at the date of the appraisal. I have made an appraisal of the four years, 1914, 1915, 1916 and 1917. As a basis for valuation, I determine first a value new for each item of equipment based on normal price conditions, not on such abnormal conditions as exist today in the equipment market. The basis for my normal price conditions is the actual cost of equipment purchased by the railroads of the United States during the period from 1911 until 1913 and 1914, just prior to the influence of the war situation.

The data from which I take my price units is the actual costs to the railroads operating west of Chicago of the equipment they have purchased in recent years. I have had access during my work in various states, and in connection with my work on this committee of the Association of Valuation Engineers, to the actual costs of practically all of the equipment purchased on practically all of the railroads west of Chicago. That gave me an immense fund of information, from which it was possible to derive averages representing the actual cost to the carriers of their equipment. That gave me a set of units under normal conditions, which I apply to the different types of equipment on the South Shore at the date of the several appraisals, and arrive at a value new, based on the fair, normal cost of new equipment. From that I deduct a percentage representing the used or realized service, and measure the remaining value, the depreciated value, of the equipment on the same basis that a life insurance company uses in setting up a mortality table on human life,

1683 By the normal, I mean the average. I might also say in that connection that I have tested that average with the average for a five year period prior to 1911 and a ten year period to 1911, finding a striking similarity, or agreement, so I consider that the basis upon which I arrived at the new value of these various pieces of equipment is truly a normal price under normal market

conditions.

I would hesitate to set up any definite factor of difference between 1916 and before, but in 1915 there was a slight slump in the prices; i.e., the average prices in 1915 would probably be somewhat lower than the average for the period immediately preceding it. In 1916, the war influence was felt, and there was a slight rise or recovery of the prices, though not nearly so much as has been felt in the past

vear.

My own investigations of the actual history of equipment on the railroads west of Chicago has shown me that the locomotives in service have actually given their owners an average service of 26 years. That is made from a study of a large number of pieces of equipment; for instance, it represents a study on the retirement of 1991 locomotives; the actual service of these two thousand locomotives averages 26 years, and I feel that that establishes a normal period of service which we can safely use in predicating the probable remaining service in equipment today, so far as it relates to that particular class.

As mechanical engineer for the Nebraska Commission, I had access to the records of all the railroads entering the state of Nebraska. As chairman of the Equipment Valuation Committee in the Association of Valuation Engineers, I had charge of the collection of like data for that Association, and in that connection was able to have the valuation engineers of the other states collect the data along the lines that I outlined, so that all of the states col-

laborated and furnished me, or rather collected under my 1683a direction, the data from the railroads in their jurisdiction. Then, too, since leaving the Nebraska Commission, I have handled cases on several of the southern roads, including the Frisco, the Katie and the Santa Fe, so that I have been able to extend my personal

investigations to the equipment on these roads.

My method was exactly analogous to that by which the life insurance companies estimate the probable remaining life of a human be-I set up, first, the curve representing the per cent of equipment remaining in service at the end of each year from the date it was new; that gives me a table of expectancy on the performance of equip-The average of that curve at the time the equipment is new ment. gives me the average life of equipment. In other words, a freight car can be expected to have 20 years' service at the time it is new. However, if that car lives to be 20 years, it still has some remaining

My curves enable me to set up for any period or any age of that car the expectancy of remaining service. Taking the freight car, for instance, as an example, when it is new, it has an expectancy of 20 years, as I stated; when it is ten years old, it has an expectancy of 10.6 additional years; when it is 15 years old, it has an expectancy of 6.6 additional years; when it is twenty years old, it has an expectancy of 3.6; when it is 25 years old, it has an expectancy of two additional If it lives to be 30, it still has some probable life, or an ex-

pectancy of 1.1 years.

Under my theory, so long as there is life there is hope, in that car. I never would come down to the actual vanishing point in the value of that car. Now, that gives me the expectancy, and by adding the expectancy to the realized life I get a measure of the total expected Now, as the value of a piece of equipment exists in the possibillife. ity of its use, so its value diminishes as its use has occurred.

1683b If at the age of 10 years we have 10.6 years' remaining service in that car, the proportion of its value which has been used by the company, or, rather, which remains to the company, is represented by the relation of this probable remaining usefulness in years of service, 10.6 as against the total represented by the sum of its realized life and probable remaining life, or 20.6. In that case, the remaining usefulness would be 51.4%. Now, 51.4% applied to the wearing value of the car, which in a case of freight cars is 75.3%,

gives 38.7 as the remaining portion of the wearing value of the car. In a car there exists two elements, one which is constant, the salv-

age value, that does not decrease—it is always in the car. car is scrapped, it is returned to the owner; therefore, the depreciation can only apply to the other part, or the difference between that and the total; that other part I designate the wearing or depreciating

portion of the equipment value,

My Exhibit 321 represents my valuation of the present locomotive equipment of the plaintiff for each year, 1914, 1915, 1916 and 1917. The column, "Total Replacement Cost," represents the cost to replace that locomotive new, using, as I say, the average or normal price existent between the years 1911 and 1914. I might add that that

price is based on a cost per ton of locomotive and tender, using the loaded weight of the locomotive plus the light weight of the tender, and is a study on which I have been working for the past eight years, which sets up the average cost of locomotives per ton for each of the weights from forty tons up. In other words, the schedule in prices decreases per ton as the weight of the locomotive increases, a light locomotive costing more per ton than does a heavy locomotive.

My study of locomotive prices and depreciation is the result of the analysis of the actual costs of practically every locomotive purchased on practically every railroad west of Chicago, going back for a

1383c considerable period prior to 1911. I have used prices paid for locomotives in former years, bringing them up to the normal period by means of a scale of fluctuations in prices. The expectancy table for locomotives was derived in exactly the same way as I de-

scribed in discussing the depreciation of freight equipment.

There are three distinct factors making for depreciation which of necessity must be considered in my calculations. The first is the lia-Lility to accidental destruction which adheres to the piece of equipment the moment it is placed on the rail. The second is the wear and tear and decreptitude, which is gradual and which culminates finally in the total destruction of the piece of apparatus. The third is the madequacy or obsolescence which comes to the equipment just as surely as the years go by; no matter how well designed a piece of equipment may be when it is new, the advancement in the art of railroading will bring about a condition finally which has changed the conditions under which that piece of equipment must work and has rendered it obsolete or inadequate to meet the service. The combination of the three make- for the total depreciation or elimination of the equipment, and, as my studies are based upon the actual performance of the equipment on these various Western railroads. I have necessarily included in that the liability against these various forms of depreciation.

Exhibit 322 is my valuation of the passenger train cars. The first three columns, as with locomotives, were taken directly from Mr. Fowler's exhibits. The cost to replace is based on my average units of the cost to construct passenger equipment. I paid especial attention to the passenger equipment while I was on the South Shore last week, examining a great number of their coaches and passenger cars,—I am positive over half of them,—so that I could gain a very clear idea as to the character of their equipment. Then, by means

of my average prices, which have been worked up as with locomotives from the actual cost to the various companies in the

United States, I was able to establish the cost new or cost to reconstruct the equipment in kind, using the normal price—not the price existent at the present time. That, then, was depreciated, as with locomotives and in exactly the same way, to get the present value, or, I prefer to term it, the present fair value, of the passenger equipment in each of the years, 1914, 1915, 1916 and 1917.

Defts,' Ex. 321a represents a valuation of the locomotives on South Shore which have been retired since April, 1914, or, rather, since September, 1913. The locomotive, then, that were in service at the date of the several appraisals are included in this statement, which

should be added to the statement shown in Defts.' Ex. 321.

Defts,' Ex. 324 shows, first, the locomotive price units I have used in the appraisal of the South Shore locomotives. The tabulated statement gives, first, the weight of the engine in tons, and in the corresponding column the price per ton. That weight of locomotive is the weight of the engine in running order, plus the weight of the tender light-that is, without coal or water in the tender. a statement reading that the above prices include the costs of locomotives on the rails of the owner, except the freight from the factory; that is, these prices included all of the setting up and breaking in and messenger service charges, so that the only extra to be added is the freight from the factory, which in this case I have estimated at \$6 per ton, that being approximately the cost to get locomotives from l'hiladelphia to an equal distance in the west. Not having definite data as to the exact freight rates to the South Shore points, I used that factor. The lower half of the sheet shows the price units used in establishing the new value of the passenger cars on South Shore. The statement on the left hand side of the sheet gives a value for the bare car body of the different lengths and different types.

the trimmings or trucks. On the right hand side of the sheet are the detailed prices for the trucks and fittings. From this schedule it is possible to take a description of a car and set up a table which will represent the normal price of building that particular car. These units are abstracted from the book of units which I have compiled from a study of the actual costs of equipment on the western roads, and represents a fair average normal price existent prior to the European war. The passenger coach price, or the passenger car prices, I might say, cover transportation to a point within a radius of approximately five hundred miles from Chicago, so that in this case it was unnecessary to add to the passenger car units a freight charge to get the equipment upon the rails of the South Shore.

My value on plaintiff's equipment is as described and set forth in Defts.' Exhibits 321 and 321a, Locomotives, 322, Passenger Cars, and 323, Freight Cars, for the years 1914-1917. Defts.' Ex. 324 shows

the locomotive unit prices used.

KATES.

Cross-examination.

By Mr. Tracy:

I spent three days on South Shore, inspecting all the equipment I could find around Marquette, Ishpeming and Negaunee, the inspection of locomotives being to determine if the South Shore equipment was peculiar in any way to distinguish it from that of other railways of the country. I did not visit the shops and study the shop records as to repairs, or investigate the maintenance. I found nothing peculiar about the equipment.

In reaching my unit prices, I based them on the average of the

prices paid for similar equipment used on the western railroads in the period of time from 1911 to 1914. In arriving at my per-1683f centage of condition, I based that upon the average life of all

locomotives and passenger and freight cars of similar classes on the western railroads. I feel confident that my studies give a ratio which is truly reflective of the conditions today, with our present The percentage I applied was the percentage condition of the average of all the equipment of the same age on the western

railroads—those west of Chicago.

I was on the South Shore three days of last week, going from Mackinaw to Marquette, spending considerable time around Marquette, going up to Negaunee and Ishpeming, and inspecting all the equipment I could locate in those two yards, and then spending another day in the yards at Marquette, inspecting every train as it came through relative to the passenger equipment and all of the freight equipment and locomotives that were in the yards at that

My inspection of the locomotives was made in the yard simply to determine if the equipment on the South Shore was peculiar in any way from that existent on other railroads of the country. an investigation as to type. I did not visit the shops or study the shop repair records, or investigate conditions regarding maintenance of equipment, or the character of water used in the locomotive boilers, and things of that kind. I proceeded on the assumption that, regardless of obsolescence, an engine is bound to wear out, and has an absolute life, regardless of maintenance, my table being computed upon a life of 26 years for locomotives, 33 for passenger train cars, and 20 for freight train cars.

KATES.

Redirect examination.

By Mr. Groesbeck:

On my visit to the South Shore, I found nothing peculiar or unusual about the condition of the South Shore equipment—nothing but what I would expect to find on any other road under similar circumstances. I valued the locomotives purchased in 1913 at the original cost to the company.

1638gKates recalled by defendants December 4, 1917.

Direct examination.

By Mr. Groesbeck:

Defts.' Ex. 327 shows the mortality, depreciation and expectancy curves used by me in my valuation. On the first sheet of this exhibit I have given a brief summary of the processes by which the final ratios were computed. The mortality curve, as shown on the three classes, as I stated in my direct testimony, is history, being taken from the actual performance of equipment on the western roads. The expectancy curve and the depreciation curve are mathematical deductions made from the mortality curve. The ratios expressed by the depreciation curve were carried forward on to the first sheet, to get them into statistical form, and it will be noted that the ratios shown on sheet 1 of this exhibit (327) are the ratios which I have applied against the cost new prices on the equipment in the appraisal which I have entered for the South Shore equipment.

I testified that the average life of a locomotive was 26 years, but that actual average life really does not enter the computation. The mortality curve and expectancy curve refer to life of remaining service, while the depreciation curve carries that into a value reference; therefore, the mortality curve and the expectancy curve will go from 100% down to nothing, while the depreciation curve will go from 100% not lower than the constant salvage value, or, in this

case, 10%.

Take an engine 20 years old; the mortality curve shows expectancy of 9.1 years. We can expect that engine to remain in service 9.1 years more. On the mortality curve, if we add together the per cent for all the remaining or succeeding years and divide that by the height of the abscissa at the year representing the age of the locomotive in question, that will give an average for the additional life. In other words, that is by a mathematical calculation the exact expectancy for an engine 20 years old, as calculated or as

shown by the performance of engine in actual service. If we start at the left hand side, the date the engine is new, and plat the percentage for each of the years from nothing down to 50, and divide that by 100, we will get 26 years, which I stated in my direct testimony is the average life for all conditions. That, however, is the only place in which the average life enters this cal-

culation. The actual cost of each of the locomotives purchased in 1913 by the D. S. S. & A., of the 700 class, was \$18,264.50, including super-The unit cost of those locomotives in 1913, according to my estimate, was \$15,743. The cause of the apparent discrepancy The average on which my is that these engines had superheaters. basic unit prices are based includes engines which have superheaters and some which do not have superheaters, so that, applied to a group of engines, as is usually found on a railroad, some with superheaters and some without, the average works out. That is illustrated by the memo. I have added to the lower part of that sheet, wherein I have shown a record of the purchase of 316 locomotives during the year 1913, on which the actual cost to the railroad was \$8,883,783. plying to the weights of these 316 locomotives my average unit, I would get a value of \$6,968,672, or just slightly in excess of the actual cost. In other words, almost an exact agreement with the Now, the units, if applied to a single group of engines which had some extraordinary feature, such as superheaters, would, therefore, be slightly under, and there is no disagreement, then, in this apparent discrepancy with the actual cost. However, if the

unit be applied to engines, none of which have superheaters, then they are in excess, and that is actually what has happened in my appraisal on the South Shore, because I find that none of the other engines on which I based these units actually had superheaters. To that extent, I have given them credit, then, for something which they do not have.

1683i KATES.

Cross-examination.

By Mr. Tracy:

Q. I understand that you say the difference is due to the fact of

the superheater?

A. No, I didn't mean exactly that. That is one of the things that would make a difference. There might be other things. You might have purchased these particular locomotives under adverse condition. In other words, I was trying to set up that comparison of units. That one actual purchase would be meaningless.

1684 Edgar French, a witness for defendants, produced before the Court, Nov. —, 1917.

Direct examination.

By Mr. Groesbeck:

1 am a civil engineer. I began railroad work in 1879, and have spent practically all my life in that kind of work. I was with the Grand Trunk Railroad for 22 years, as resident engineer and assist-

ant engineer.

When I left the Grand Trunk, in 1901, I went into industrial engineering with Joseph H. Berry, of Berry Brothers, at Detroit. I had charge of all his real estate improvements and building operations in different parts of the country. I rebuilt in 1903, the Newberry Furnace, on this line; built a varnish factory for him at Walkerville; rebuilt the Manufacturers' Railroad in Detroit; was on the Saginaw & Flint Railroad, in charge of a part of that work; in charge of the building of an interurban line from Bay City to Saginaw, which is work very similar to much of this; rebuilt the Toledo & Detroit, from Toledo to Dundee.

I was in Mr. Barry's employ until 1907. My work with the Grand Trunk was maintenance of way and engineering. I had charge of the construction of all of the work the Grand Trunk did west of the Detroit and St. Clair Rivers, while I was with them, to

the time they started double-tracking.

I had charge of building their line from Elsdon across to 49th St. in Chicago, to connect with the Western Indiana; I was on the construction of their line Valparaiso to Chicago, in 1879 and 1880.

I have never had charge of a piece of railroad construction work entering into a new country. I have never had to build where I had any great difficulty, in the transportation end of it. I have never

really had to face the problem of whether in building 1685 400 miles of new line I would have to ballast it as I went

along, or ballast it afterwards.

I have recently been working on the South Shore, for the purpose of obtaining data concerning conditions and costs pertaining to that company's property. I began in the latter part of June; I left in August, 1917, on account of illness; and was again there in October,

two weeks.

I walked all over the Mackinaw Division, except the branches; the main line from Soo to Marquette, and St. Ignace to Soo Jct.; also went over the Houghton Division, from Marquette to Houghton, and from Marquette to Winthrop Jct. over the south line. That is the old Marquette & Western. I did not walk from Nestoria to the Wisconsin state line. I have been over it a number of times on pas-

senger trains.

I made an estimate of what it would cost under normal conditions in 1914, 1915 or 1916, to do the necessary grading on the various divisions of plaintiff's line. Taking into account the modern methods of moving earth, I figured that the earth could have been moved for 25 cents a yard straight through. I wouldn't change plaintiff's figures on solid or loose rock. The material would be principally sand, though part of it would be muck and clay. In doing the work through swamps with ditching machines, which would be the proper way, you would have no use for corduroy.

1686 Henry C. Adams, a witness for defendants, recalled before the Court, Dec. 4, 1917.

Direct examination.

By Mr. Carr:

I am at the head of the Department of Political Economy, Business Administration and Sociology, at the University of Michigan. I have made a special study of the science of railroad economics and the principles of railroad accounting. I have also made a special study of the permanency of prices due to a condition of war; I have been obliged to study that whole question of war financeering. I

have written a treatise on that subject.

My judgment as to whether the high present prices are likely to be permanent is that the prices at present are quite abnormal, and, judging by what has happened in other cases in the past, it is not likely that those prices will be maintained after peace has returned. That applies, in my judgment, to the prices of material and of labor used in railroad construction and operation. My answer is based upon the study and investigation I have made of the matter. I might perhaps add that in the study of war financeering it becomes necessary to trace both the effect of the financial administration of the war upon the prices during the war to find out when that upward tendency stops after the return of peace, and when the period of fall comes. I think it is correct to say that in all cases the movement of prices will follow that general order.

I know nothing in the present situation that would warrant the expectation that the high war prices of the present time will continue after normal commercial and industrial conditions return.

In my judgment, it is unfair to the public to include a valuation based upon the movement in prices. This rests upon two thoughts: one is that it departs from the basis of investment; the other is that under the established rules of accounting the maintenance of

1687 the property brings those increased prices as a burden to operating expenses. That is true, because when a unit of property goes out of service, there is charged to operating expenses the cost of replacing that property at the existing price, so that these increasing prices are taken care of from time to time by concurrent charges to operating expenses. I cannot think it quite fair that these prices should increase the charges that the public must pay for railway service, and at the same time that the railway should include the result of these increasing prices in valuation among its assets. It seems to me that it is counting the same thing twice, which of course would be improper. That is, the public pays it in the form of a charge at the time the particular units of property are replaced, so that if it is necessary to replace, in order to replace in kind a certain unit of property, to charge to operating expenses more than the original cost of that property, operating expenses are called upon to bear the difference.

In my judgment, if the appreciation of any kind which is not offset by a sale of securities, which means a real investment, is included in the valuation of property for testing rates, that is equivalent to a capital profit; that is, equivalent to the actual increase of the assets of the company, and that therefore in testing a rate there should be added to the operating profit which comes from operation this capital profit in order to get the true profit that the company has been benefited. For the purpose of testing a rate when the appreciation is included in the figure used, I would regard the total profit or income as made up of operating profit and of capital profit. On that theory, it is my judgment that appreciation in prices should be regarded as capital profit and added to income if the value of

property is taken.

The Court: Suppose there were involved in this suit solely the question as to the adequacy of the return in 1917; what values of property would you take to base that return upon, upon

which a return should be given?

A. I should seek for a value which fairly represents the investment of the people who put the money into the business. I do not think I could find a value for testing a rate on this theory of confiscation if I were confined to the particular year when the case arises.

The Court: The peculiarity about this situation, that a rate statute may be constitutional at one time and unconstitutional at another with reference to the same railroad. Taking that into consideration, if we were solely ascertaining whether the statute were confiscatory at the present time, what values of the property would you take?

A. I would take the value which in my judgment represented the investment of the people, of those who put their money into the property.

The Court: Well, let us go a step farther: suppose it were assumed by both parties that the measure of the value is the cost of reproduc-

tion new, less depreciation.

A. It is difficult for me to discuss things of that kind because I am not altogether sympathetic with the theory of the costs of reproduction. I think there are a great many mistakes in it and you have assumed that that is correct; but even in that case I should exclude from that value appreciation which did not represent any investment whatever of those who put their money into the property in so far as I could discover in 1917 what that appreciation was.

The Court: Would you do that regardless of what you term war conditions? For instance, to make my meaning plain, we have periods of depression, business and financial, commercial depression, when prices are abnormally low. It has been the history, I think that when the recovery begins it increases for a period of years, for a cycle of years. Now during the period of constantly increasing prices would you take as the basis of value of the property preceding the period, during the period or what might in view of experience be called probable future, or probable future increase?

A. I doubt if it is possible in a case of this kind, seeking after equity, to do equity to either party, if you take your valuation on a particular year. In all the cases that I have been connected with I have insisted at least in taking ten years, and my reason for taking at least ten years is that ten years is the usual period of industrial cycle, so that in those ten years you have had the bad, the good and the excessive; and I feel that in matters of this kind it is not possible to tie one's self down to a particular year, but that we must take the general trend, the average of a period and project that possibly on the experience of the past into the future. It was that feeling that made me hesitate about 1917.

The Court: Of course the larger element which constitutes a price is the labor element. It is true, is it not, that since the panic of 1893, with an occasional year of either stagnation or perhaps a slight decrease, the value of the labor element has constantly in-

creased.

A. That is true in the past few years. It was not true after the war of 1860, that the high prices of labor did not fall. I suppose that at present the explanation of the more or less per-

is entirely a non-commercial fact, and whether or not that is likely to continue after this excessive demand for labor due to the requirement of the transition from the condition of peace to the condition of war and industry, is a very difficult question to answer. I will be perfectly willing to express my opinion on that or anything else, if it is desirable, but it gets into a pretty big subject, of whether or not the trades unions have gotten up as high as they are going to get; that is a pretty big question. There is no question but what at present a large element of the increase of these prices is due to

labor, but it is by no means all. It is due also in large measure to the peculiar war conditions of this country for the two years before they entered the war. It is tied up with the general fact that the financial center of the world is temporarily, at least, transferred from London to New York. It is tied up with the fact of the enormous demand for munitions on the part of European countries which are allied to this country, and which also we had to sell the bonds to pay for. While I recognize that the labor element is very important, I should not like to be understood as conceding that it is the only element in the explanation of the inflation which we now suffer.

Q. You think that is true Professor, that a period of high labor costs is followed by excessive development in labor saving machin-

ery? Has that been a matter of history?

A. That was the result in 1860. Most of the agricultural inven-

tions date from about 1862, and very high in 1863.

Q. Now, will you tell us from the study that you have made of railroad operation, as to the probable effect in your judgment, under ordinary conditions, of a reduction in rate upon the volume of traffic which may be expected.

1691 A. Answering that in a general proposition, it is true that the reduction in any price or any rate tends to increase the

volume of sales, in this case, the volume of traffic.

I think my personal investigation on that subject is limited to what is known as the Michigan Central Charter Case, when the Michigan Central sued the State for damages on account of the repeal of its old charter, the result of which was to bring that property from a three cent basis to a two cent basis. In that case the change in the basal rate was followed by a considerable stimulation of traffic. I want, in fairness to the situation, however, to add that there was in connection with that situation the educational influence of the electric lines that are paralleling the Michigan Central, the education of the public to riding and using trains, so that in honesty I should hardly like to go on record as saying that all of the increased passenger traffic, following the repeal of the charter, was due to the change in the price. The reduction of the rate and the education of the public came at the same time, and the education of the public came through actual travel, under reduced rates.

I have made some study and investigation with reference to the historical reasons for the construction of that part of the South Shore system which runs west of Nestoria. I have drawn my historical information on that subject from the Railway Age, the Railway Gazette, the Railway Review, the Commercial Financial Chronicle, the Engineer News, Poor's Manual, the Michigan Railway Reports, some of the New York papers, and the Marquette Mining Journal. I have referred to publications put out at that time, or immediately preceding or immediately following the construction of that line. I went

through these publications during the period that would be affected by this case. I took off over four hundred references.

Mr. Eldredge: If I understand, all of this is a part of the Record already. I haven't the slightest objection to it, being

called to your Honor's attention, but it doesn't seem to me that it ought to be necessary to camber this record with it the second time.

Mr. Carr: Now if the Court please, I don't understand that there is any of this material actually in the record; that the parties have proceeded on the assumption that the Court might take judicial notice of all of this because it is of a historical nature, and as counsel suggests, the purpose is merely to call the attention of the Court to it.

Mr. Wykes: It was in the record for use in brief. I don't know whether it was formally introduced, but it was produced as historical data, and I take it any means for bringing historical data to the at-

tention of the Court is proper.

Mr. Eldredge: I doubt whether this is historical data or not. I haven't the slightest objection to it upon any other ground than that

we ought not to put it in the record twice.

The Railroad Gazette of March 13, 1885, quotes the following from the Marquette Mining Journal relative to the purchase of the M. H. & O. and that part of the M. W. Railroad: "We have reason to believe that this sale is part of a general agreement, by the terms of which the M. H. & O. is to at once complete to a point of junction with the Milwaukee, Lake Shore and Western and the D. & M. is to build through to Sault Ste. Marie. The Canadian Pacific is now within sixty miles of the Soo, we understand, and will put its line to that point without delay, when sure that the connecting line is progressing to meet it. The completion of all these lines as indicated will give us the through route between the seaport so essential to the

rapid development of this region and for which our people

1693 have waited so long and patiently."

The Court: If this were a jury trial, I am quite certain that the Court would have to rule out any testimony of this kind, I am quite certain it wouldn't be competent evidence.

Q. Based upon this investigation you have made, Professor Adams, will you give us your views of the reasons for the construction of this

line west of Nestoria?

A. The line west of Nestoria as shown by the citation which I have before me was built for the purpose of connecting up a through system. It was not built for the local traffic. It was built to make a link between the Eastern Portion and certain railroads centering or terminating in Duluth and Minneapolis; and my interpretation of these readings is that it would not have been built had it not been for the desire to make a through east and west system.

Q. Professor Adams, are these citations to which you have referred and the data that has been available to you in your investigations, in your opinion, sufficient to establish this, as a historical ques-

tion?

A. Unquestionably.

1694 C. W. HILLMAN, a witness for Defendants, produced before the Court, Dec. 5, 1917.

Direct examination.

By Mr. Groesbeck:

My place of business is at Louisville, Ky. My present residence is Utica, New York. I am a public accountant, specializing in railway accounting and investigations, having been in that work for

eleven years.

I have been in a large number of cases of rate litigation, starting with Kentucky on the two cent rate under the McCord Act; following with North Carolina, on its two cent passenger rate case; special investigations for Florida, of railway matters for their Railroad Commission, three cent passenger rate there—a reduction from four to three; freight rate and express rates several times; Alabama on the two cent passenger rate case, combined with a change in commodity I was with them twice. Returned to North Carolina on freight rate matter; for West Virginia in their passenger rate cases, Norfolk and Western and also Chesapeake and Ohio; on freight rates for the coal shippers out of West Virginia; Indiana on its express rates; Illinois on passenger rates and coal rates; North Dakota oa coal rates; South Dakota on grain rates and two cent passenger rate case; Ohio coal rate cases; Michigan, two cent passenger Ann Arbor There have been a number of others where I have been in consultation and given testimony.

I commenced work in this case March 17, 1917. I had from three to five assistants, and Mr. Parker had two. In general, my work was to obtain the data from the books and records of the company or by investigations to determine, first, the amount of the expenses chargeable to Michigan; second, how much of those expenses were chargeable to the passenger business; third, how much of the passenger ex-

penses in Michigan were applicable to the regular passenger and baggage business, how much to sleepers, to diners, and to mail and express; then to determine how much of the passenger business was due to intrastate and how much to interstate; to assign all additions to and deductions from income to these various classes of expenses; to apportion the property values; to determine the amount of capitalization, the value which was applicable or chargeable to each class of business, and then make the application; how much the return would pay in percentage on the investment.

Defts.' Ex. 329 contains my figures and the results of my work. The item taxes will be revised to accord with the actual payments now set forth and used by Delf, the taxes I have used being taken by me on the accrual basis. They will be divided proportional to the value

of the property in each class of business.

The plan of the exhibit (329) is indicated by its index. The factors are first stated, being the ratios of our assignments to Michigan and to services. Then follow the expense accounts by item; with a summary; then an analysis of the revenues and income account.

To illustrate my method: Refer to page 27 of the exhibit No. 1, "Superintendence," Maintenance of Way and Structures, 1914. The road system figure is \$23,253.50; assignment to Michigan was made on Factor 1-D, the relation of active accounts in this block of expenses in Michigan to the total; the Michigan percentage, 81.0531, equals \$18,830.71, superintendence for Michigan. Factor 1-G (page 3 of the exhibit) shows the proportion chargeable to passenger, or 27.1648 per cent, equaling \$5,115.32. To assign this to services, Factor 1-J is used, as this is an overhead account, divisible on the balance of the active accounts in the block of expenses.

Referring to account 2, "Ballast" 1914. The Michigan expense was actually allocated; it was then assigned to passenger on Factor 16-A, page 20 of Defts.' Ex. 329. This factor is used as part of the tracks are exclusively freight, part exclusively passenger, and the remainder common to both, the latter, having been assigned to passenger on the basis of the gross weights using the common track. The derivation of the percentages used in Factor 16 is shown on the factor itself, referring for track percentages to Factor 14 and for gross weight to Factor 13. On Factor 14, page 18 of the exhibit, is shown the common trackage, 456 miles, ex-

clusive freight trackage, 165 miles, and exclusive passenger, 2 miles.

As it costs more per mile to maintain main track than sidetrack, the question became the proportion between the two. We adjusted the mileage by treating the main track as two and the sidetrack as one, on the basis that it costs \$2.00 to maintain a main track as against \$1.00 for a sidetrack. To be liberal, we used this ratio, though our investigations indicated \$1.50 per main track mile to \$1.00 per sidetrack mile. In my investigations to determine this ratio, I found the road divided into sections, each in charge of a gang. I assigned the actual expenses of maintenance incurred on each section to the section; I then went over the blueprints of sections and took off the percentage of side and main tracks on each section: I then classified the sections, combining all those having 95 to 100% main track, then those having 90 to 95% main track, then those having 80 to 90% main track, and so on, classifying the sections until I came to the other end, where there was less than 10% main track or the bulk of the work was on sidetracks. This gave a series of equations showing how the expenses would be affected by

the admixture of sidetrack with main track or main track with sidetrack, as my sections were scattered all over the road and represented all conditions of the traffic, because the sections having these percentages were not contiguous; they were scattered. I then equated the track and worked out the percentage which would be indicated by the admixture of the different classes of track. The highest percentage that I could obtain by any combination in the whole series was 172%, indicating that for every dollar expended on sidetrack per mile there would be \$1.72 on main track. When we combined the results for the four years, the combination of all our percentages and equations gave us \$1.49 per main track mile, against \$1.00 per side track mile. These figures are derived from the actual operations of company and their actual book charges.

At Marquette, I examined the red books on which the reports of the section bosses are made to show the amount of material and labor they are using in their track. We used them constantly in the assignment just mentioned of maintenance expenses to different sections. I found them incorrect. I did not feel from my examination from prior records that the men making these reports were competent to put in the statement whether it was a freight expense or a passenger expense. I made one test to determine that, on section 34, in 1917, where the section men's report shows a large expense to passenger direct, as well as to freight, and there is not a mile of passenger track on that section. That confirmed my idea that the men were not competent to differentiate between freight and passenger, and I discarded Delf's location for 1917.

To continue as to Factor 16: 82.9078% of the adjusted trackage was common to freight and passenger. The expense of that common track we have assigned to freight and passenger on the basis of gross weight passing over the common track, as shown on

1698 Factor 13, page 17, or 30.108% passenger.

The reason for using the gross weight is that it is indicative of the wear of the track under traffic; the heavier the weight over your track, the more it is worn, and the more repairs and the better upkeep become necessary. This is distinctly shown by this road, where they were compelled to increase their rail and strengthen their

bridges, to accom-odate the heavier weight.

The only matter to be determined is whether a ton of passenger traffic over the track has the same effect on track wear as a ton of freight traffic. The objection mostly made against the gross weight factor is that it takes no account of passenger speed. This claim neglects the reverse of the proposition which is that the freight equipment is not kept in as good condition as the passenger and therefore exerts more wear on track per ton moved than does the The more I have studied the matter the more I have come to the conclusion that the balance should be against the freight and that the freight tonnage should be weighted when the comparison of gross tons is made, and not the passenger traffic. Items to be considered in weighting the freight tons are, first, the construction of the freight rolling stock, running on insufficient springs, cast wheels instead of steel-tired wheels, trucks not balanced to absorb lateral and vertical pressure, and second, the constant nosing of the freight cars due to inequitable loading and to the exertion of the engine as it pulls from side to side, moving more slowly, jerking the cars backward and forward. This constant snake-like weaving motion can be noticed by sighting down the side of a train moving over the track. In the passenger train, the higher speed prevents to quite a large extent, this weaving motion. The engines are compensated for the load they have to draw and for a

1699 given speed; so long as the speed is retained within the limits of compensation there is no more hammer blow for the passenger than for the freight engine; when that speed in either passenger or freight engine is heavily exceeded, the hammer blow is more

manifest than at regularly compensated speed.

In freight traffic, there are a number of flat wheels, which do not exist in passenger traffic. When a passenger car gets a flat wheel, it is repaired. In freight, it is not done with such frequency, and there is more latitude allowed in the number and size of flat spots than in passenger traffic. A flat wheel, from its very construction, must deliver a blow on the track.

To divide common Maintenance of Way and Structures Expenses,

I used the gross ton mile basis.

A train slows up approaching a weakened bridge because on a bridge vibration has a very deliterious effect. When a bridge is weakened, it is necessary for them to go slowly over it in order to reduce the frequency of the vibration so it will not come to a danger point. On a bridge there is always a possibility of accident from the weights passing over it, and if a train is moving at a slow speed and the bridge gives way under the weight, the train will not be thrown off the bridge into the river or ravine, or whatever it is they are crossing. I think that has more to do with the matter than vibration.

My idea is that the slow orders over the bridges are for the prevention of accidents, as an accident is more dangerous at high speed.

The train miles enter into certain of my divisions of accounts. It is used in the item, 202, "Railway Maintenance," page 227 of Defts.' Ex. 329, 221, "Fences," page 228, 223 "Snow and Sand Fences and Snowsheds," page ———, 225, "Crossings and Signs," Fences and Snowsheds," page ——, 225, "Crossings and Signs," page —, and 372, "Dispatching Trains," page 238.

For Dispatching Trains, inquiry developed that one-third

of the dispatcher's time was spent in train movement, and the other two-thirds in the distribution of cars over the line in order to

move the freight.

Since the attention of the dispatcher to individual passenger cars is infrequent, I have considered two-thirds of the dispatcher's time to be used in the distribution of freight cars and chargeable directly to freight. I considered it desirable to make the adjustment in this account, instead of burdening account 373, "Station Employees," with

When a train dispatcher sends an order, there is a reciprocal receiving service at the other end in the passenger station, which - taken care of by the operator there. In making our distribution of station services, we have not considered this time taken by agent-operators in receiving train orders. That we may have recognition of that service, I assumed that, though the train dispatcher's pay is higher than that of the men to whom he is sending the message, just as much of their time, as expressed in money, would be consumed in receiving his orders as of his in sending them. I have, therefore, taken one of the other thirds of his time and charged that to dispatching trains. As I had already charged of- these men's services under my Station Employees a certain percentage of their time to the passenger business, it was necessary to charge only the difference between the two percentages on the second third of the dispatcher's time to the train movement in order to determine the exact amount that should be in station service on this account, but, for convenience sake, had been recognized in this dispatching. This gave me a total percentage of

68,3911%, which, divided by three, gives 22.7967% of the dispatcher's time chargeable to the passenger business. The dispatcher

is located at Marquette.

probably be taken by every operator along the line, as a matter of information to other trains which might want orders or information for the passengers. All the time necessary for such messages and the dispatching of trains is considered by me to be included in this one-third of the dispatcher's time. I have offset the time of the dispatcher and his assistants as against that of the operators who receive the message. The taking of the message by the operator, to post his bulletin according to law, has reference to passenger trains. I did not take into account the question of the train dispatcher's higher salary as compared with the numbers on the other side. The numbers of the station agents would certainly offset the higher wages,

perhaps exceed it.

I used engine miles for divisions of expenses, but where that has been used it has been pretty thoroughly agreed upon between us and the railway company. I used other special factors for the division of certain expenses, which are shown in the exhibit. I made a study of the Mackinaw Trans. Co. and assigned its expenses to freight and passenger on the basis that two freight cars equal one passenger car, that being the basis indicated by the road in its division of expenses. The receipts are almost entirely from passengers and taking passenger expenses from the receipts shows the passenger-carrying business of the Mackinaw Trans. Co. to be profitable. The freight cars are handled over the Mackinaw Trans. Co. ferry without charge, and the expenses divided up among the three owning companies. plaintiff handles the Soo Line freight cars over the ferry, and the net expenses to the plaintiff are split up with the Soo Line on the basis of cars handled. The Soo Line thus participates in the passenger earnings over the Mackinaw Straits. The totals of this divi-

Mackinaw Trans. Co. on the passenger business was, for the various years, 1914 to 1917, as follows: 1914, \$30,450.38, 1915, \$27,126.71, 1916, \$27,814.50, and 1917, \$23,483.21; this is the entire profits, and not the plaintiff's share. To arrive at these profits, I have charged against the passenger earnings the passenger proportion of the entire expenses. There is a loss on freight traffic, and the expenses of that traffic are supposed to be divided between the three roads in proportion to the traffic of each. The only way the plaintiff participates in that profit is through its stockholding in that corporation. The basis of any consideration of the Mackinaw Trans. Co. is that plaintiff's trains are ferried across the Straits, and that this is a ferry bridge.

Referring to page 226 of Defts.' Ex. 329, the Mackinaw Trans. Co. operations are not included in my figures, but this company stands on its own feet, leaving the question to include or exclude it at the discretion of the Court. My computations with reference to the

Mackina.r Trans. Co. appear in Defts.' Ex. 330.

In my computations, I have stated the Mineral Range as standing

by itself, as an item of expense which can in no wise be considered as having reference to the matter here in controversy. From Houghton to Calumet is a distance of 14 miles. I have taken the expenses which accrued upon and are directly attributable to that run and set them to one side, since the plaintiff received no compensation for that run; the fares all go to the Mineral Range Road, and therefore in the computation to determine the efficacy of the two cent passenger rate on the plaintiff's road these expenses should be set aside before any computation of that character is made. When I say that there is no compensation whatever.

is no compensation whatever, I am referring to the collection of fares on this 14 miles. There is a slight compensation, which I have taken care of, and which Mr. Parker took care of in his exhibits, for two of the trains which run up there, the C. M. & St. P. trains pay a certain rate which might be called a mileage charge, and of that mileage charge I have taken into my earnings on the D. S. S. & A. only the D. S. S. & A. mileage proportion; and against the Mineral Range run expenses, which I have set off, I have credited their proportion, the 14 miles, of this revenue or rental recived from these trains, or privilege payment for running these

The expenses set out for the Mineral Range are on a mileage or percentage basis, and I take out the total operating expenses of the train, including Maintenance of Equipment, Fuel, and Train and Enginemen's wages.

I have investigated the average tie life, the renewals and costs of ties, and the number of ties of different kinds of wood, on the plaintiff's railroad, and Defts.' Ex. 331 pertains to that subject. The line at the bottom of the second sheet, "Average for 10 years," shows the average tie life. This was for 10 years ending, in 1911, 11.69 years, in 1912, 11.81, in 1913, 11.38, in 1914, 10.47, in 1915, 10.20, in 1916, 10.14, and in 1917, 9.92.

The costs for ties stated is the price paid for the ties delivered on the plaintiff's property. I think it includes nothing for distribution. The data for Defts.' Ex. 331 was obtained from the company's reports. I find that the price stated is that at the distributing point and I should say includes inspection charges and distribution into a yard ready for use. The I. C. C. interpretation of the account, "Ties," is that it includes the cost, the labor of handling, distributing and putting in track is charged to account 220, "Track Laying and Surfacing," which would indicate that the price includes nothing beyond inspection.

I investigated the reciprocal service which passenger service furnishes for the freight, and vice versa. The freight performs service for the passenger, in hauling company material afterwards commonly used. In my gross ton weight factor, 13, will be found the company material ton miles. The car weights carrying this company material are all included in my car miles as taken from the books of the company, so my gross total weight includes the company material and charges that much of the expense to freight. I have made a computation by primary accounts, to show how much this would affect the total carried. I find the total passenger per-

centage of the freight service due to carrying company material would be 1.1%, that is 1.1% of the freight expenses is undertaken in carrying the passenger material. On the other hand, there is a reciprocal service in passenger for the freight; e. g., in 1915, plaintiff's passenger miles were 29,682,083; that year, annual passes were issued for 2,165,113 passenger miles and trip passes for 2,346,867, a total of 4,511,910, which is 13.2% of the total passenger miles. Reducing these according to the general distribution of payrolls between freight and passenger, the conclusion is reached that 4.9% of the total passenger miles were issued in passes on freight account, which, multiplied by the general average of freight expenses to passenger expenses, gives 1.57% of the total expenses as chargeable to the freight account from passenger service, as against 1.1% of the total chargeable to 1.57% of my total expenses should be charged to freight and 1.1% to passenger. I have so many passenger miles; the resultant would be the cost per passenger, whether he paid his fare or not, and in freight a ton of company material accounts for just as much as In taking the payroll, a man drawing \$150 a ton of revenue freight.

a month would count three times as much as a man drawing 1705\$50, but'I have no means of determining the specific employees using passes. It might be more nearly accurate to divide it on the employees, rather than the wages, until we come to those employees having duties in both passenger and freight. think it would be more nearly accurate to divide according to the number of employees, and then to divide the common employees on the basis of those located rather than on the salaries or wages paid. There is no direct relation between wages paid and the miles the man The only relation would be that passes are distribis dead-headed. uted over the whole service, and the measure of the pay would indicate the general number of men in the different services. the rule that the employee carried must have transportation. certained the number of miles from the stubs of the passes. This includes passes issued to members of the employees' families. strictly followed out, there would be a slight charge against the freight service and a credit to the passenger—the difference between 1.1% and 1.57%. This does not enter into the computation in Defts.' Ex. 329. By material carried in freight trains, I include coal. be well to mention that official cars, in the service of both passenger and freight business, are charged in toto as to repairs to passenger service.

On account 201, "Superintendence," M. of W. & S. 1917, Ex. 329, Summary, page 249, I assigned to passenger \$5,012, and Delf assigned \$7,811, the difference being caused by the fact that it is an overhead account, treated alike by the both of us, and the underlying accounts are not the same in amounts.

Account 202, "Roadway Maintenance," page 227 of the exhibit I locate on Factor 16, line 9, which separates the exclusive track maintenance, per Factor 14, and the balance on the train mile factor including switching. Mr. Delf used his modified revenue train mile

basis for the entire account, setting out his so-called allocated

1706 exclusive maintenance. I used my basis for setting off the exclusive from the common. In this account, maintenance is not dependent on wear, but facilitates the passage of a train as a unit. I believe my method closely approximates the use or tells the cost of maintenance for each service.

In account 208, "Bridges, Trestles and Culverts," my difference of \$2,900 plus less than Delf is due to his use of the modified revenue train mile basis, while I divided the common on gross weight basis,

Factor 13, as the weight measures the use of the bridge.

In Account 212, "Ties," I charges \$12,910 to Michigan passenger, and Delf \$21,775, the difference being due to Delf's use of the modified revenue train miles and my use of the gross weight basis for common. Parker and I both used the gross ton mile factor for this account. We differ slightly, because I have included the company materials and carried out my percentages a little farther.

I meant, when I said I had not included or charged for carrying company material, that I had not entered the amount due to company materials on the passenger account and made a like adjustment in freight for service performed by passenger. The total cost of carrying company material is now charged to the freight business, it being

offset by the 1.57% of passenger service above described.

As the cost of carrying freight employees and their families is included in my passenger expenses, I regarded the 10 tons of passenger loading sufficient to include that. Including company freight, the gross weight basis on common track is 30.108% passenger; ignoring

it, it is 30.629% passenger, for 1914.

1707 Accounts 214, "Rails," 216, "Other Track Material," 218, "Ballast," and 220, "Track Laying and surfacing," are assigned by me on the gross weight basis, and by Delf on the modified revenue train mile ratio, my ratio of 21.3972% being further modified by the separation of exclusive tracks, as against Delf's 42.21%. Delf takes out the exclusive in another method, so the percentage would not be comparable at this point.

(If witness followed Delf's method, he would first set off the exclusive track and divide the balance of the common by a different percentag—25.6875% passenger.)

I would first take 17.28% of the total expenses and set it off to freight and .1988% to passenger (Factor 14), and the balance, 82.5238%, I would divide on the gross weight basis of 25.6875% (Factor 13). Instead, I have combined the two percentages into a total percentage (Factor) of 21.3972% passenger (Factor 16). I have combined the equated track and gross ton miles in one factor.

I do not accept Delf's so-called allocation to exclusive track, as my investigation led me to discard the reports of the section men as being incorrect. The records on which plaintiff claims to have separated the maintenance of exclusive track were not records regularly kept in the conduct of the business. It was a side record, kept to meet the order of the I. C. C. to locate everything as far as possible. I do not consider them reliable.

Account 221, "Right of Way Fences," I divided on the train mile

basis; Parker on the time ratio.

Accounts 223, "Snow and Sand Fences and Snowsheds," and 225, "Crossings and Signs," are assigned by me on Factor 11-E, revenue train miles plus switching, and by Delf on modified revenue train miles.

In account 227, "Station and Office Buildings," page 229 1708 of the exhibit, both Delf and I allocated to freight certain amounts and to passenger \$1,764. The remaining common, of \$4,541, Delf assigned on modified revenue train miles, 42.21%. Of this \$178.98 referred to the Marquette station. After assigning the excess over that amount, of \$4,362.21, on the basis of account 373, the portion of the Marquette passenger item relating to the building commonly used for the general purposes of the line was split 50-50, the results being shown in 227-B.

Account 231, "Water Stations," I divide on the basis of accounts

385 and 397, and Delf on accounts 382 and 394.

Account 233, "Fuel Stations," I divide on the basis of accounts 382 and 394. Delf and I differ on this, in the assignment to Michigan, as he permits the entire expenses to remain in Michigan, while I percent them over the system, on the theory that the use of water

or fuel stations extends beyond their actual location.

Account 235, "Shops and Enginehouses," I split between shops and enginehouses, locating the enginehouses to Michigan and spacing the shops over the entire system, charging to Michigan only its proportion of the shops which they have used. This is done on Factor 2, line 1, page 208 of Defts.' Ex. 329, showing the repair account in shops as located in Michigan, 81.5%, by splitting the engine repairs on engine miles, the car repairs on car miles, freight and passenger, and the work equipment on work equipment miles, between states, which would result in the proper charge to each state. Those four repair accounts are then combined, and that is the use to which your shops have been put. I consider that a more equitable division than Delf made, as Delf's method leaves the entire shop expense in Michigan, regardless of the fact that work is done for service outside the state.

1709 In account 247, "Telegraph and Telephone Lines," Delf and I agree on the location to Michigan, but he uses modified revenue train miles, while my factor is overhead to the transportation block of expenses. The telegraph service is mainly in the conduct of the transportation business and can well be considered over-

head to this business.

Account 249, "Signals and Interlockers," I assigned to passenger on a special investigation of the occupancy of tracks by time and the number of trains, which shows 5.24% passenger. Mr. Delf used

modified revénue train miles.

Accounts 265, "Miscellaneous Structures," 269, "Roadway Machines," 271, "Small Tools and Supplies," 274, "Injuries to Persons." 275, "Insurance," 276, "Stationery and Printing," and 277, "Other expenses." we take as overhead, while Delf uses modified revenue train miles.

In account 272, "Removing Sand, Snow and Ice," the 1% to passenger and 70% common was by agreement with Delf. To divide the 70% common, I used train miles plus switching (Factor 11-E) while Delf uses modified revenue train miles.

In account 278, "Maintaining Joint Tracks, Yards and Other Facilities—Dr.," the difference from Delf is only \$33.

In Account 279, "Maintaining Joint Tracks, Yards and Other Facilities—Cr.," in the freight, passenger and common assignment, Delf and I agree. The \$5,092, common, Delf divides on modified revenue train mile basis. I separate into tracks, roundhouses, water tanks and other common expenses and divide the first three on the basis on which expenses were charged at for these various items for passenger. Delf's credit figure is \$6,171, and mine is \$5,252.

1710 Under the Maintenance of Way and Structures group, my charge to Michigan passenger is \$131,341, and Delf's is

\$205,704, a difference of \$74,363.

Under Maintenance of Equipment, I charge \$109,056.64 to Michigan, against Delf's \$111,624. In this group, I have assigned a portion of the Michigan passenger to the Mineral Range run. made no similar assignment; e. g., under account 308, "Steam Locomotives-Repairs," we assigned to the Mineral Range that portion of the engine repairs which the mileage of their runs bear to the total passenger engine miles. I charge the Mineral Range run with a portion of the expense of account 309, "Steam Locomotives—Depreciation," 317, "Passenger Train Cars—Repairs," according to the mileage of passenger cars on that run, considering only the South Shore cars; also account 318, "Passenger Train Cars-Depreciation," and account 301, "Superintendence."

Under the group, "Traffic Expenses," there is no appreciable differ-

ence between Delf and myself.

Under Transportation Expenses, I have charged against Michigan passenger, for 1917, \$347,480, against Delf's \$327,337, a difference A number of minor differences between Delf and myself appear in the exhibits. Only the larger items will be here mentioned.

In account 373, "Station Employees," I charged to Michigan passenger, for 1917, \$21,986.56, against Delf's \$42,781, a difference of We both located \$79,330.95 to freight and \$11,412,97 to passenger, leaving as common \$84,072.96. As about 53% of this account had been located to freight and passenger, I divided the common on the basis of the located. I thought it a better factor to take a located expense than to reach over into some outside factor, such as modified revenue train miles, whose bearing on the

question is not particularly direct. I confirmed the propriety 1711 of this basis by taking Marquette station, where they had both freight and passenger work and where the force was divided. then took the freight and passenger receipts for Marquette, and found that for every dollar of freight handled in the city of Marquette the cost was 4.06 plus cents for station service, and that for every dollar of passenger business the cost was 2.617 cents. ing the 4.06 to the total freight receipts of the road, of \$3.394.

350.53, gave me \$137,888.12, and to the passenger receipts, of \$668,898.18, applying 2.617, would give \$17,503.65. The comparison indicates a percentage of 11.26421 passenger. I have used 12.5769%

passenger.

By freight handled, I mean the receipts at Marquette, for freight received and forwarded. The agent has to take it in and take care of his dollars when they come in, in billing and collections, and when they go out he has to take care of his freight and bill it out. In other words, he has to have dollars in and dollars out. I mean, by freight handled, the freight consigned to or shipped out of Marquette. If freight is received at Marquette it is included; if simply rehandled, it would not appear. This was simply in confirmation of my percentage. The trouble about taking a station which was not a division point was that they haven't the accounts split up into passenger and freight, excepting at points that are subject to criticism. Mr. Delf divides account 373 upon the modified revenue train miles basis.

Account 376, "Station Supplies and Expenses," is treated in the

same way as 373.

In account 404, "Signal and Interlocker Operation," I assign 5.24% to passenger, against Delf's 42.12%, modified revenue train miles.

The difference between Delf and me in the item, 372, "Dispatching Trains," and the methods I used, have already

been commented upon.

Under Transportation Expenses, I assign from the Michigan passenger proportion to the Mineral Range run various items, aggregating \$14,568.07, and Delf makes no similar allowance. Under account 371, "Superintendence," \$234.76 is assigned to Mineral Range. I also charge the Mineral Range in account 392, "Train Enginemen," \$3,239, being its proportion according to mileage; under account 394, "Fuel for Train Locomotives," \$6,384.51, being mileage proportion; I also make charges to Mineral Range in accounts 397, "Water for Train Locomotives," 398, "Lubricants for Train Locomotives," 399, "Other Supplies for Train Locomotives," 401, "Trainmen," and 402, "Train Supplies and Expenses."

Under the group, "Miscellaneous Operations," there is no differ-

ence between Delf and myself.

Under the group, "General Expenses," we both divide as overhead to the balance of the operating expenses. There is a necessary difference between us because of our difference in previous assignments. Under this group, I charge passenger with \$24,359.49, against Delf's \$27,661.

For the year 1917, I have total charges against Michigan passenger of \$685,491.51, while Delf has \$790.721, a difference of \$105,230. This is made up principally in track wear account, maintenance of way expenses, station services, station supplies and expenses, and dispatching trains.

The \$19,095.72 charged to Mineral Range would reduce my \$685,491 when I come to assign to interstate and intrastate, as that

there disappears.

In 1914, an addition to the Thomaston enginehouse, located 14 miles east of the Wisconsin line, necessitated a charge to operating expenses of about \$40,000. This expense I divided to states according to the service rendered by that enginehouse, assigning to Michigan passenger on account of it \$4,923.49, which was considerably less than Delf's assignment. My total assignment to Michigan passenger on account 16, "Buildings, Fixtures and Grounds," for 1914, page 33 of the Exhibit, was \$11,293.42. In account 241, "Wharves and Docks," the passenger expenses for

In account 241, "Wharves and Docks," the passenger expenses for repairs of the ship dock at St. Ignace are assigned on the basis of one passenger car equaling two freight cars, which is the method adopted by the company. I call attention to it as that is the basis of our assignment of passenger expenses of the Mackinaw Trans. Co..

it being the company's established ratio.

In Factor 11, I include the mileage of light engines, as they receive the same protection by the dispatcher in giving orders as a regular train mile. From my examination of plaintiff's accounts, I find that, outside the freight service, the losses, if any, are incurred in the mail and express and sleeper and diner business. I should say that, so far as the express business is concerned, the matter can be readily cured by contract, as the Soo Line owns the express company and the Soo Line and plaintiff are both controlled by the C. P. R. I treat the mail and express as an outside service.

West of Marquette, the foreign sleeper service is duplicated. While the dining service is furnished principally by the plaintiff, there are diners on the so-called Chicago runs of the C. & N. W. and C. M. & St. P., which are of little, if any, service to the intrastate passenger. They are maintained for the benefit of the through run, with the exception of passengers from Menominee and Escanaba.

I have no method of measuring that service. There is a diner 1714 on the C. & N. W., into the Copper Country, put on at Escanaba. I have shown in my exhibit the outside or auxiliary services separately, with the losses which pertain to each class of traffic.

Defts.' Ex. 332 is the State's claim of valuation in 1913, plus additions and betterments each year since, with an assignment of the values to passenger and freight for each consecutive year, which shows the values and divisions for respective years as follows:

Year.	Total.	Freight.	Passenger.
1914	\$11,674,752	\$9,108,698	\$2,566,054
1915		9,098,716	2.598,758
1916		8,906,240	2,619,894
1917		9.231.665	2,644,203

The assignment to services is upon the factors in Defts.' Ex. 329. On the first sheet of the valuation exhibit the factor used is indicated. The additions for each year have been carried forward upon the factor noted.

Direct allocations to passenger are marked "P" and to freight "F."

For rolling stock, the values of Mr. Kates

were taken for each year and assigned on the basis of the mileages

for that year.

For example, all track structures, such as ties, rails and ballasi, are divided upon the gross weight basis, Factor 13-A. No exclusive track is set off, as that has been allocated, and does not appear in the common property. My factor of gross weight for 1914 is 30.108%, as against Delf's modified revenue train mile ratio of 45.09%.

I deem it necessary to divide common property on the same ratio or factor as I use for expenses. The reason is that there is a com-

mon use of the common property, and if we can find the factor which governs the use, it must necessarily govern the value which is used. It necessarily follows that, if the Court adopts my division of operating expenses applied to the track structure and roadbed, it must also adopt my division of the property on the same ratio, and if the Court should adopt Delf's division of expenses, I believe it should adopt his division of property.

In dividing expenses, I based all my methods as closely as I could obtain it on the actual use of the property, to the factor which it wears, out and therefore shows its use, and when that is done the value of

the property would be measured by the expense.

Defts.' Ex. 333 takes the Master's value for 1913 and adds to it from year to year the net additions and betterments. According to the same methods as indicated for Defts.' Ex. 332, this exhibit by the use of factors divides the value to freight and passenger.

Mr. Groesbeck: While items 35, "Engineering on Equipment," 37, "Contingencies," 43, "Working Capital," and the item "Appreciation" are listed on Defts.' Ex. 333, we claim they should not be included in the value.

They are included because the Master included them. Upon Defts.' Fx. 333, the various values are shown as follows:

Year.	Total.	Freight.	Passenger.
1914	 \$14,451,525	\$11,147,160	\$3,304,365
1915	 14,474,319	11,087,938	3,386,381
		10,871,582	3,369,962
1917	 14,449,251	11,085,443	3,363,808

For Defts.' Ex. 333, I have used the same unit prices, for 1917, that the Master adopted for 1913, plus the actual expenditures, according to reports, for each account. This means I have started with the Master's valuation and have made no depreciation since 1913.

Defts.' Ex. 334 is a combination of the Defts.' Exs. 332 and 333. I have made a study of plaintiff's passenger traffic for the Western Division, from Nestoria west to the state line. The passenger miles on that division were:

Year.	Interstate,	Intrastate.
1916	 5,090,983	1.072.032
1917	 4 154,501	1,324,074

The constant sleeper costs on plaintiff's railroad, meaning those costs which would remain the same if the sleepers had not been run, as charged in the various accounts of Defts.' Ex. 329 to sleepers, for the years ending, June 30, 1917, were \$40,590 for 1916, \$42,686, for 1915, \$38,326.

From my investigation of plaintiff's accounts and business I find that during each of the years, 1914, 1915, 1916 and 1917, plaintiff was making a fair return upon a fair value of the property used in

the intrastate passenger business. That is my judgment.

1717 C. W. HILLMAN.

Cross-examination.

By Mr. Tracy:

I have been a witness in many rate cases of which I have men-

tioned the most important.

In the Western Passenger Fares Case before the I. C. C. the methods I used in dividing the accounts were substantially those I have used After dividing expenses to Michigan, my first effort was to find the amount assignable to maintenance of exclusive freight tracks. In general my method was to take a ratio, assuming it cost half as much to maintain a mile of side track or freight branch as a mile of main line, thus producing an equation resulting in my assigning about 17.27% of the total maintenance expense of track structures such as rails, ties, track laying, surfacing to the maintenance of exclusive freight track. I did not accept the Delf claimed direct allocation of the expenses for 1917, to different tracks because I felt the figures were not correctly reported by employees-they were not correctly assigned to freight or passenger. I referred to section 34 showing the amount assigned to passenger by the section foreman when there was no passenger track there. That assignment appears in September, October, February, March, April, May and June in varying amounts, the year's total being \$1,525.54. That is the amount entered in the passenger column by the section foreman. I do not know whether that was corrected at headquarters. I find Mr. Delf assigned to exclusive passenger \$793. The errors were in track material. do not look to see how his labor book checked with that. I made this examination to determine whether the reports were correct and finding them unreliable I paid no further attention to it.

I knew that they were not carried in by the company as a passenger item though reported as such. I abandoned the idea of allocations and undertook to determine the amount by estimate. I did not consider that they were allocations. My estimate is based on the assumption that one to two is the relative cost of maintenance of side track to main line. I confirmed my basis for this figure by taking the total expense for every section and comparing it with the total amount in the section. There was no such report except in 1917 when they commenced to report between freight and passenger. A number of things led me to doubt the accuracy of the report; it is a new innovation, the men are not used to it and 1 mode

this investigation to determine whether I should accept the red books (Defts.' Exs. 335-336) or discard them. I took the total of each section foreman's report of material, priced it with the regular price list and calculated it out. This expense could be allocated if the company gave the proper directions and had bright enough section foremen to report it; they would have to give specific instructions as regards, for instance, a switch located on main track leading to a side track. The work of that switch would be done in main track yet the entire work would be chargeable to the side track.

After I obtained the assignment to exclusive freight track I divided the common portion of the maintenance accounts according to a number of ratios. For several I used the train mile ratio, but for the greater bulk of expenses I used the gross ton miles. Page 218 of Defts.' Ex. 329 shows the basis of my gross ton mile ratio for 1917. That includes the ton miles of company freight. That is included, though not properly chargeable as a freight item, because in my opinion it is more than offset by the free service given by the

passenger train in carrying employees on passes. That is not the reason I included it. The reason for including it is because it is part of the freight service. The object of analyzing it was to determine how much of the freight service should be charged back to passenger. I decided to make no charge of that to passenger as it was more than compensated by the service given by passenger to freight. In the figures of miles on annual and trip passes I included travel by employees and their families for business or pleasure, and annual passes used by officials of plaintiff and other roads including exchanges. They are given to officials of other roads in exchange for passes to officials or employees of this road. If an employee, freight, passenger or common of plaintiff was compelled to make a company business trip to Chicago, an exchange pass would be requested for him. If it was properly company business his expenses would be properly chargeable to operating expenses and to the extent that he was able to travel free on other roads the operating expenses of plaintiff would be reduced. Exchanges passes are given on this theory. I made no attempt to find the amount of exchange passes.

In computing the goes ton mile ratio we take each car and each engine and multiply its weight by its mileage made. We multiply the ton by the distance it moves. That is on the theory that the expense of maintenance of the structures to which this ratio was applied is measured by the weight passing over it during the course of the year by the several classes of business. The ton mile is the measure of expense because in my opinion it causes it. I make no direct computation on account of the speed but it is not lost sight of. Defts.' Ex. 329, p. 219, 1917, contains my computation by which I obtained

the apportionment of expenses assigned to exclusive freight tracks. That is 17.27% to exclusive freight. In other words, equating track two to one I find that 17.27% of the tracks are exclusive freight. It appears that a little under 5% of the tonnage was carried on these exclusive tracks, though I am not sure. (See later testimony.) Assuming the figures of the exhibit to be correct

it would be practically 6.5% of the freight which is made on the main track. Applying the 51,000,000 ton miles made on exclusive freight track to all ton miles on all tracks, freight and passenger, the percentage is 4.9%. This 17.27% is no theory, it is a fact. If they do not reconcile it is correct that my theory is wrong and the fact right. I think, you will find the facts in consonance with the theory.

Page 235, Defts.' Ex. 329, shows accounts 326, 327 and 328, Work Equipment divided between passenger and freight as overhead to the maintenance of way and structures expenses. The 1-8 factor opposite account 326, should be 1-7. Account 328, Work Equipment Retirements, I assigned to services on factor 1-17, not on 1-7 as mis-

printed.

Accounts 326-328, Work Equipment Repairs, Depreciation and Retirements, were all assigned to services on the same percentage, 1-17; in assigning these accounts as overhead to the maintenance of way group I follow the same theory as Delf. Whatever way the court decided, they would follow the apportionment of maintenance

of way expenses.

Defts.' Ex. 329, p. 238, station employees—the common portion,. I have divided between passenger and freight on the basis of the allocations using the same allocations as Mr. Parker. The allocations were checked over with Mr. Delf. The stations that I used were the Soo, St. Ignace, Marquette, Negaunee, Ishpeming and Houghton, being the points where the allocated expenses principally occur. I do not know what the allocations for Negaunee

were; if they were common \$416, freight \$50 and passenger \$150, that would settle the allocated expenses at Negaunee but would be too incomplete a basis for any computations for the balance of the road. If it appeared at Ishpeming that the expenses were, common \$537, allocated freight \$892, passenger \$5, that would truly express the relation of the passenger and freight business at that station. I tested out the accuracy of the 12+% passenger by a computation as to the amount of money handled by the freight office While that is not proper cost accountand by the passenger office. ing in a large station, the cost of handling a dollar of business of each class and applying that to the total number of dollars handled on the line would give an idea as to what the result would be had they both grown to the point where they could have a freight and passenger man to handle them. If the passenger fare were reduced from three to two cents the ratio would go down. We cannot use the gross earnings basis in any way save as a fact of general confirmation. It is a test only to see if your computations are excessive either way. If I had found that it run down to two or three percent or gone up by 40% or 50% passenger, I would feel that there was something wrong with my computation using 12%+. If one station handled nothing but iron ore or coal and another was a shipping point for furniture there would be no comparable unit which could be arrived at on the amount of money received or handled. My confirmation proves nothing except that for every dollar the agent handled in passenger there was an expense of 2.6¢ and in freight 4¢+. It proves nothing save setting a general test to determine

whether or not you have passed the boundaries of probability, either higher or lower. The division of 376 station supplies and expenses, is dependent on 373 station employees, in part as is 227, re-

1722 pairs to station buildings. The idle time of employees at different stations varies. I presume there is a considerable portion of the time when the men are not busy. At small stations where the agent is not as busy as at a larger station, his compensation is sometimes based upon the importance of his station. Defts.' Ex. 329, p. 246, Accounts 452, Clerks and Attendants in General Offices, 453, General Office Expenses and Supplies: the common portion is assigned on factor 12-15 and 9-15 is a misprint. Those "9" factors

are all misprints for "12."

The group "general expenses" were assigned by both Delf and myself as overhead to all other groups and changes made in the other. groups would be reflected here. To divide the passenger expenses between inter and intra state I used the passenger miles the same as Delf, except as to station accounts. I assigned station employees to inter and intra on intra factor 1, p. 224, Defts.' Ex. 329. That is on the time of the agent consumed in sale of tickets. I differ from Parker who assigns on the relation of passenger miles and Delf who assigns on the relation of passengers travelling. The effect of my calculation: coupon tickets and simplex (card) was to reduce Delf's ratio from 88.78% intra to 88.07%. To reach my basis (Referring to p. 156, Defts.' Ex. 329, 1916) I had one of my men go to each train for a period of six weeks and with a special watch test the time it took the agent to dispose of a passenger and find out what class of ticket the man was getting. I found it took an average of about ten seconds to handle a simplex or Mineral Range ticket; it took 50 staronds average, to sell a coupon ticket, it being there necessary to punch limits on the side and possibly look up facts with which the agent is not familiar. On coupon tickets, interstate and in-

trastate the average time was about 5.75 times as long as for 1723 the card or simplex ticket; I then determined how many simplex tickets were sold in inter and in intra state. I then found how many tickets other than Mineral Range, were sold and multiplied each of the inter and intra coupon ticket sales by 5.75. On the mileage handled by agents I used the same percentage. results of these figures I found the clapsed time in seconds to be intra 536,672, inter 75,136, or that intra tickets represented 87.55% of the agent's effort to sell them. On timing sales of sleeping car tickets we found the time selling and making the entry ran about with the coupon ticket, though we made no computation based on this. I have made a separate assignment of expenses to the operation of sleepers and diners including chair and observation, mail and express cars, having shown results separately for sleepers and diners. This is the first case where I have made that assignment though I have always had it in mind. I used it to a limited extent 7 years ago in an express case in Minnesota. That was to get information as to the amount the Wells-Fargo was paying for express service on the St. Paul. This is the first time I have gone into it in detail in a passenger rate case. From my exhibit you could determine the net revenue from plaintiff's freight business by subtracting my Michigan passenger expenses from my total expenses and apply the bal-

ance to the Michigan freight revenue.

My division of revenues and the equipment accounts, between passenger and freight would correspond with those of Mr. Parker sufficiently for comparison.

Redirect examination.

By Mr. Groesbeck:

Page 218, Defts.' Ex. 329: The heading "all tracks" is in error.

It was my intention when I first set up this data to add under 1724 the head of "all tracks" the train weights on exclusive freight tracks, which were outside of train and yard switch. We found that a task of considerable magnitude requiring much data and as we did not intend to use it omitted it. Inadvertently I allowed the heading "all tracks" to remain and the heading is misleading as there will be freight movement where there are exclusive freight tracks—could not possibly be the same as common tracks. The figures under that heading included the switching tonnage and do not include any tonnage on the exclusive tracks or in ore movement.

Recross-examination:

The items in the first column on p. 218 are the cars, locomotives and loading of the trains on plaintiff's road as distinguished from the movement of cars and equipment on common track. In addition to the train movement on common track or in train or yard yard switching, there would be whatever movements there were over exclusive freight tracks of which there is 12.07 miles main track, 20.87 miles ore spurs, 20.76 industrial spurs, and 116.71 sidings. freight main track and ore spurs would certainly have a movement which has not been considered in our train or yard switching. 12.07 miles of main track I obtained from Mr. Parker and it was checked with Mr. Delf. The detail shows 4.23 miles Negaunee to Winthrop Junction; 2 miles Republic Branch, 3.8 Fiborn Quarry branch, 2.3 Bessemer Branch. I do not think the mileage on all these branches is included in the switching miles. It is now my claim that the figures shown in the first column "All Tracks" with the train movement are the total tons of train movement on common track only. Delf's Ex. 204, p. 14, gives the total Michigan freight net tons, one mile as the same. I judge that would represent Mr.

Delf's calculated ton miles for the road It does not indicate a mistake in my exhibit under "Common Tracks;" it may occur from the fact that the computation of Delf's ton miles was from the billing point. If it included the whole amount it would be necessary for us to reduce the tonnage on common track. I claim a train movement on 12.07 miles of exclusive main line track and 21.87 miles of ore spurs as distinguished from switch movement and not fully included in my switching miles. I do not know it to be the fact that the service on the Fiborn Quarry, Bessemer and

Republic Branches is entirely switching. To arrive at the ton miles of yard switching, the tonnage engine miles in the yard were calculated and to that was added 4.8 cars per movement with their average weights, in the method pointed out by Mr. Parker. The average percentage of loaded and empties is taken. The average percentage of load for the switching movement is the average loading of cars on the road. I do not know how Mr. Delf made his computation of ton miles. I took his figures for that.

1726 C. W. HILLMAN, recalled.

Examined by Mr. Groesbeck:

Defts.' Ex. 339, assigns the passenger values, shown on Defts.' Ex. 332, to the different classes of service, 1914-1917. The method of assignment is shown in the column headed "Factor." In account 36 appears the Soo Union Depot all charged to passenger and baggage, though a study might be made whereby we would assign it to different services. The production of the overhead percentage is shown on the lower left hand part of the exhibit. In the division of the passenger and baggage expenses to inter and intra, accounts 17 and 36 are divided on my intra factor 1, as they are both station accounts and divisible on the basis of station services. The balance of the account I divided on intra factor 3, the intrastate passenger mile percentage. The second and each alternate sheet of the exhibit shows the net intrastate passenger return applicable to investment and the percentage of return for fiscal years ending June 30, 1914, 1915, 1916 and 1917, before the payment of taxes which I intend to rework. For 1914 a credit to intrastate passenger and baggage of \$422,217 is shown. We have a loss on sleepers for 1914 of \$108,145 Parker's Ex. 313, shows the intrastate percentage of sleeping car passenger miles in 1916 as 30.62%; this being the nearest year's percentage, we apply it to the loss for 1914 and at this point absorb 30.62% of the loss on sleepers or \$33,114. Our loss on diners at the same point, Defts.' Ex. 329, is \$70,990.39, the nearest factor is to assume that the diner service will be proportionate to the men that ride in sleepers, it may or may not be accurate, but it is nearer the proper amount than a passenger mile basis. On that assumption we absorb a loss on diners of \$21,737. We must also absorb taxes to get the net result and finding that they amount to 1.7495% for the year, we have \$13,995 taxes which would accrue on the passenger and baggage business. The taxes on sleeper and diner property,

assuming 30.62% intra, are also absorbed. Deducting the amounts to be absorbed \$74,231 from the \$422,217 profit, we have a net profit of \$347,986 for 1914. The total value of the intrastate passenger property including passenger and baggage, sleepers and diners, is \$1,107,730, upon which the percentage of net return shown is 31.41% or after allowing the loss as computed by Delf, This is after absorbing both the expenses and values of the sleeper and diner service. I suggest this point: that the bulk of the traffic wherein the losses occur is interstate; only 8.8% of

the intrastate passengers out of 23,000,000+ miles, passenger in 1917, used the sleepers and 33+% of the interstate passengers out of 9,800,000 passenger miles used the sleepers, which are the heaviest cars they have and the heaviest expense that is incurred. I believe the South Shore derived the return shown, on the value of the property used in intrastate passenger business, in 1914. Mr. Delf's figure for the value of intrastate passenger property is \$2,741,000 this being what the Master found. The difference between my intra passenger and the Master's is due to the difference in method of assignment to passenger and that he uses a different percentage to assign to the intra its proportion of the sleepers and diners. My total valuation is \$2,566,054, and my passenger value is \$1,107,730, of which I assign approximately one-half to intrastate passenger. The sleeper and diner business are responsible for it as there is no difference in the cost between inter and intra passenger on this road save the slight excess to intrastate on account of the station services. I arrived at the results for subsequent years in the same manner as

described for 1914. The results are as follows:

1728

Year.	Total intra valuation.	Net return.	Per cent return.	Per cent return allow- ing loss,
1914 1915 1916	1.174.267	\$397,986 210,454	$\frac{31.41\%}{23.03}$	$\frac{19.56\%}{12.37}$
1917	1,292,659	$288,127 \\ 319,583$	$24.07 \\ 24.72$	$13.55 \\ 13.13$

Referring to the so-called constant costs for 1917, in the expenses charged out on my Ex. 329 to sleepers, diners, mail and express, certain expenses would exist if there was no such business: e. g. to illustrate, Account 201, Superintendence, 202, Road Maintenance, 221, Right of Way Fences. These are examples, my exhibit will set

forth each account and the amount.

I furnished Mr. Dadson some data for his exhibit, No. 319. I obtained it from the annual reports of the Company filed with the State (evidently printed reports) containing expenses. I told Mr. Delf I would examine into their capitalization and asked him for the data which the Company had. They had furnished these books for the benefit of the Interstate Commerce men who were examining on this point. I requested Delf to leave the books there, which he did, and used them while at Marquette. The accounts taken from those printed reports were afterwards checked over by Mr. Dadson in Lansing and minor changes made in them from the sworn reports.

Defts.' Ex. 340 shows the so-called constant operating costs by primary accounts, assigned to sleepers, diners, mail and express, for 1915, 1916, and 1917. They would remain constant even if the sleepers, diners, mail and express had been eliminated from the train

consists.

Defts.' Ex. 341, is a statement showing the amount paid employees of the Soo Union Depot for the year ending June 30, 1917. This is taken from the joint accounts and does not appear in the 1728a item "Station Employees." Dividing one-half to Soo Line, I find the amount paid passenger employees to be \$3,044. It was not included in the allocation of amounts to station employees at the six stations listed from which I obtained a passenger percentage of 12.6. Including it would raise my 1917 passenger percentage to 15.4.

Defts.' Ex. 342 shows the amount of Maintenance of Way and Structures accounts assigned by me on various factors, 1914 to 1917

inclusive.

I have had experience with reference to the effect of a reduction in rate as stimulating business. At least one experience along that line, in the case of Louisville and Nashville v. Florida; the rate was reduced from four to three cents. The railway claimed the traffic had reached the maximum and a reduction in fare would be followed by a reduction in earnings. Before the final hearing of the case, which ran three years with the three-cent rate in operation, the earnings more than doubled. I attribute that both to the growth of the country and the reduction of rate. There has been a steady growth in passenger traffic in Florida during the last decade, though this road is outside the excursion limits or belt. In my opinion, there is stimulation of business where the rate is reduced, though the amount can only be determined by experiment.

W. W. Walker, recalled, before the Court on Dec. 7, 1917, by plaintiff in rebuttal.

Direct examination.

By Mr. Tracy:

I reside in Duluth; am and have been plaintiff's vice-president and general manager six years. Have been in plaintiff's employ since 1890 in the capacity of travelling freight agent, assistant general freight agent and general freight agent, the latter for 10 years prior to being general manager. The Mineral Range Railroad Co. stock is owned by plaintiff 52% and by Tamarack & Osceola Mining Co. It is managed by a separate board of directors on which the minority stockholders have large representation. The operating officials are the same as plaintiff's but the accounts are kept separately. The Mineral Range is an old railroad and I understand was in operation prior to the construction of the M. H. & O. to Houghton. The Mineral Range operates, the shore line between Hancock and Lake Linden, and from Gay to Traverse Bay on a leased line. one time it operated passenger trains between Calumet and Houghton. The building of a trolley line between those places caused them to discontinue the passenger operations. The center of population of Houghton County is Calumet, it being the largest center of population on the South Shore. The trolley line practically destroved the passenger earning power of the Mineral Range. were unable to pay operating expenses. We operate on the Shore line now, as there is no trolley from Houghton or Hancock to Lake Linden and we must furnish the service. The plaintiff commenced

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operating its train on the Mineral Range to Calumet prior to 1911—10 or 12 years ago. The reason for its doing so was that to secure business for our line we had to go where it originated; we used through trains where the volume of business was the largest. Train No. 2, Calumet to St. Ignace is started from Calumet and the extra expense of the Mineral Region.

pense of the Mineral Range run paid as there is a great deal of business originating at Calumet destined to lower Michigan points and by starting our train there we get it as against its going via Chicago. The competition through Chicago for any line is very great. People want to go through there; unless there is an attractive route by some other line, they will go through Chicago. The Copper Range and C. M. & St. P. run a solid through vestibule train from Calumet to Chicago. The Copper Range is separately owned and not controlled in any way by the plaintiff. The trains between Calumet and St. Ignace are No. 1, going east and No. 2, going west. The same reasons exist for No. 1, going through to Calumet as for No. 2, starting there. Train 16 from Calumet, at night, connecting with 7 and 8 at Nestoria, is operated from Calumet for the same reasons as 1 and 2. There is also a sleeper on that train for Duluth with which we encounter active boat competition during seven months of the year. 16 has one sleeper to Duluth and one to St. Ignace. The St. Ignace sleeper meets competition by way of Chicago. Our train No. 3, starts at Marquette and at Negaunee picks up the C. & N. W. equipment going to Calumet. It is our crew, locomotive and baggage cars and the rest of the equipment is C. & N. W. and Pullman cars maintained by it. Previous to our arrangement with C. & N. W. train 3, operated with our own equipment. 103 is the C. M. & St. P. train, Champion to Calumet, hauled by us, with their equipment, maintained by themselves, with our locomotive and crew. The plaintiff gets the fares on trains 3 and 4 and 103 and 104 and in addition we receive about \$14,000 a year rental. It would be impossible to obtain this revenue from either road if our train ran only to Houghton, as the C. & N. W. train was in competition with the C. M. & St. P. road over the Copper

Range to Calumet, and both trains must go through to Calu-As a railroad official and manager I feel that it is worth enough for our railroad to go into Calumet to make the arrangement we have by which we run our train through to Calumet over the Mineral Range and allow it to keep the portion of the fare made on its line. The Mineral Range gets the fares on the trains Calumet to Houghton and we receive from both the C. M. & St. P. and C. & N. W. \$14,000. We have a similar arrangement on our lines at Marquette with these same railroads. They operate their trains and we get the revenues. The C. & N. W. runs a train of their own with their own crew Negaunee to Marquette in the morning, pay all the expenses of the train's operation and our road gets all the fares. They want to go to Marquette to get the business originating there. Like us they encounter competition. The train originates at Negaunce, goes to Marquette and then comes back and runs to Chicago. The C. M. & St. P. goes to Marquette, ties up there and starts from there in the morning.

As general manager my particular duty is to make money for the railroad and its stockholders. I attempt to get as much revenue as I can. The intrastate freight revenues are as much as we are able to obtain. Starting in March this year we attempted an increase in interstate freight revenues; we filed a tariff to that effect and the I. C. C. suspended it. At the same time we attempted increases in our intrastate freight rates. Under an agreement with the Michigan Railroad Commission we withdrew the tariffs to await the action of the I. C. C. Thy told us if we did not withdraw them they would suspend them.

The statistical miles travelled by sleeping car passengers intrastate 33%, interstate 67%, do not altogether reflect the true conditions of travel on our road from one portion of Michigan to another.

Considerable travel from the Gogebic Range, Hurley and Ironwood to the Marquette Range and the Copper Country, goes out on the C. & N. W. to connect with us at Saxon, making that an interstate journey. They go 15 miles into Wisconsin and come back 15 miles, and that appears in the statistics as an interstate There is much business from points on our line that goes journey. from Michigan to Michigan through Chicago. A considerable amount of the traffic between Marquette Range and Copper Country and Gogebie Range is sleeper travel. A considerable portion of the mileage on passes was that of persons travelling on exchange passes. Our employees travel on other lines on exchange passes on company business and this is not shown in our operating expenses. The amount represented by this would be considerable. I imagine the exchanges we get on other roads would be larger than we give, as we are in an isolated country and all our men who want to go anywhere have to go as far as Detroit or Chicago to get started.

Cross-examination.

By Mr. Carr:

If employees of other roads wish to travel over our road for pleasure, exchange passes permit them to do so without paying fare.

The traffic originating and terminating in Michigan is controlled by interestate rate. Our application for increased freight rates was on the theory that the intrastate freight rates should be increased and to the I. C. C. on the theory that our interstate rates should be increased. The proposition of increasing the interstate freight rates is now pending before the I. C. C. and is not yet determined. The effect of increased freight rates would be an increase in gross earnings. If we get 15% increase of all freight traffic it would give us \$450,000 in round numbers. We now consider that insuffi-

cient, we ought to have more. It should be at least 20% on both inter and intrastate freight. The Canadian Pacific controls both the Soo Line and South Shore. The C. & N. W. and C. M. & St. P. trains to the Copper Country are pulled by South Shore locomotives; we use our larger passenger engines on those trains. The C. & N. W. train is made up of a South Shore locomotive and baggage car and C. & N. W. car, coach, reclining chair car,

Pullman car and dining car, making a heavy train. This requires a pusher up L'Anse Hill. Because of the size of these trains the train crew is increased by one flagman. The C. M. & St. P. trains are equally heavy, about of the same consists. The pusher takes the trains from L'Anse to Summit. The sleepers run to Calumet to pick up through traffic to points south. One reason for this is the competition of the Copper Range. The sleeper on #16 for Duluth, we take to Calumet and back because of the water competition to and from Duluth. The C. & N. W. train at Marquette uses all the stational terminal facilities. We get the fares and the rental and keep the tracks and station in repair and our employees then serve the train. When under its own management the Mineral Range independently ran trains from Houghton to Calumet and took care of the local traffic. The interurban line which forced the Mineral Range to take off its passenger trains was built about fifteen years ago. Then the plaintiff proceeded to operate the trains for the reasons given. A large proportion of the passengers Calumet to Houghton are through to other parts of the system; the local people use the traction line.

The respective parties have agreed upon the foregoing statement of the evidence as being a full, true, proper and complete statement thereof, and consent that the same may be approved by the District Judge, not intending, however, to waive the right to have further evidence returned as provided by the rules in case it shall later be found that anything is inadvertently omitted.

ROGER I. WYKES, Attorney for Appellants. JOHN E. TRACY, Attorney for Appellee.

I hereby approve of the foregoing statement of the evidence in this cause as a sufficient compliance with equity rule 75, and direct that the portions thereof included in the exact words of the witnesses be so returned.

C. W. SESSIONS, District Judge.

Dated October 30", 1918.

Filed Nov. 2, 1918, at — o'clock — M. ELMER W. VOORHEIS, Clerk.

1735 United States of America, Eastern District of Michigan, ss:

I, Elmer W. Voorheis, Clerk of the District Court of the United States for the Eastern District of Michigan, do hereby certify that the above and foregoing is a true copy of Volume 4 of Narrative Statement of Testimony on Appeal comprising typewritten pages num-

bered one thousand three hundred and twenty-four to one thousand seven hundred and thirty-four inclusive, in the therein entitled cause as the same appears on file and of record in my office; that I have compared the same with the original, and it is a true and correct transcript therefrom and of the whole thereof.

In testimony whereof, I have hereunto set my hand and affixed the seal of said Court, at Detroit, in said district, this twenty-first day of November, in the year of our Lord one thousand nine hundred and eighteen, and of the Independence of the United States of America the one hundred and forty-third.

[Seal of the U. S. District Court, Eastern District of Mich.]

ELMER W. VOORHEIS, Clerk.

UNITED STATES OF AMERICA: 1736

In the Supreme Court.

ALEX. J. GROESBECK, CASSIUS L. GLASGOW, CHARLES S. CUNNING HAM, Addison A. Keiser, et al., Defendants and Appellants,

DULUTH, SOUTH SHORE & ATLANTIC RAIL WAY COMPANY, Plaintiff and Appellee.

It is hereby stipulated and agreed, by and between the above named

parties, as follows:

The Clerk shall print so much of the record in said cause as is designated below by the Appellants and the Appellee, respectively.

(Designation by Appellants.)

Bill of Complaint. (Filed July 26, 1911. Docket No. 1.) Order for Hearing, Application for Interlocutory Injunction, and Temporary Restraining Order. (Filed July 26, 1911. Docket No.

6.)

Answer. (Filed Dec. 2, 1911. Docket No. 21.)

Replication. (Filed Dec. 26, 1911. Docket No. 22.)

Order appointing Special Master. (Filed May 17, 1912. Docket No. 42.)

Opinion on Motion for Preliminary Injunction. (Filed May 29, 1912. Docket No. 45.)

Order continuing Preliminary Injunction conditionally. (Filed May 29, 1912. Docket No. 48.)

1737 Bond of Complainant in pursuance of Order of Court dated May 29, 1912. (Filed June 13, 1912. Docket No. 48.) Order Continuing Restraining Order. (Filed Jan. 23, 1913.

Docket No. 65.)

1161

Memorandum Order in re Deposit in Clerk's Office of Bank Receipts of one-third of Plaintiff's Gross Earnings. (Filed Oct. 25, 1915. Docket No. 78.)

Order regarding Fund to secure Payment of Refund Coupons.

(Filed Oct. 29, 1915. Docket No. 80.)

Stipulation as to Certain Exhibits (substituting duplicates, on account of originals missing). (Filed Feb. 1, 1917. Docket No. 337.) Report of Special Master, Herbert L. Baker. (Filed Feb. 1, 1917. Docket No. 340.)

Defendants' Exceptions to the Report of the Special Master. (Filed

Feb. 20, 1917. Docket No. 343.)

Complainant's Exceptions to the Report of the Special Master. (Filed Feb. 26, 1917. Docket No. 344.)

Opinion on Pleadings and Proofs. (Filed Jan. 9, 1918. Docket

No. 362.)

Final Decree. (Filed Feb. 14, 1918. Docket No. 368.)

Petition for, and Allowance of, Appeal, and Assignment of Errors. (Filed March 6, 1918. Docket No. 369.)

Citation, with Acceptance of Service. (Filed --- -. 1918.

Docket No. -.)

Motion and Order enlarging Time for docketing Appeal and filing Record on Appeal, and Second Citation, with Acceptance of Service. (Filed ----, 1918. Docket No. --.)

Motion and Order of Sept. 13, 1918, extending Time for docketing

the Appeal and returning the Record.

Stipulation re Exhibits, dated Sept. 16, 1918.

1738 Statement by the Defendants and Appellants for the Pur-

pose of limiting the Record on Appeal.

Statement of the Testimony taken before the Special Master and before the District Court and returned to this Court, together with the stipulations of counsel and the orders of the District Court regarding the Testimony and Exhibits to be returned. The marginal record pages found opposite the testimony were inserted for the convenience of counsel and need not be printed.

The Precipe directing the Return of the Pleadings, Testimony and

Exhibits by the Clerk of the District Court.

A sufficient number of the printed comparison of valuation exhibits (Complaniant's 1, 1a and 40 and Defendants' 15) have been printed so that the Clerk will be furnished with the requisite number. The report of the Special Master, Plaintiff's Exhibits 201 to 210 inclusive, and Defendants' Exhibits 325 and 329 have been printed, and the requisite number of printed copies for use in making up the record will be furnished to the Clerk.

(Designation by Appellee.)

Plaintiff's Exhibits 33, 35, 36, 43, 52, 53, 54, 55, Sheets 5, 7, 11 and 14 of Plaintiff's Exhibit 67, Plaintiff's Exhibits 68, 201a, 201b, 201c, 220 and 221.

It is also stipulated and agreed that, instead of printing the Exhibits mentioned above as designated by the Appellee, the Clerk may, if the Appellants shall so direct and the same shall be satisfactory to the Court, cause said Exhibits to be reproduced by the photographic process.

Dated March 20, 1919.

ALEX. J. GROESBECK, LELAND W. CARR, Attorneys for Defendants and Appellants. WM. D. McHUGH AND JOHN E. TRACY, Attorneys for Plaintiff and Appellee.

1739 [Endorsed:] File No. 26,845. Supreme Court U. S., October Term, 1918. Term No. 759. Alex. J. Groesbeck et al., Appellants, vs. Duluth, South Shore & Atlantic Ry. Co. Stipulation in regard to printing record. Filed April 7, 1919.

1740 COMPLT.'s Ex. No. 33, DELF, Oct. 4", 1912.

Filed February 1, 1917, at — o'clock — M. Elmer W. Voorheis, Clerk, by Carrie Davison, Deputy-Clerk.

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Duluth, South Shore & Atlantic Railway Company.

Statement of Revenue Train Mileage, Year Ending June 30th 1910.

	Mich.	Wis.	Minn.	Total.
Freight Train Miles	897,790	176,995		1,074,785
Mixed " "	13,113			13,113
Special Service Train Miles	13,113			13.113
Special Service Train Miles	1,358		* * * *	1,358
Total	$1,659,246 \\ 83.51$	$324,061 \\ 16.31$	3,659	1,986,966 100.00

1741 Duluth, South Shore & Atlantic Railway Company.

Statement of Freight Train Mileage, Including Proportion of Mixed and Special Service Train Miles, Year Ending June 30th, 1910.

	Mich.	Wis.	Minn.	Total.
Freight Train Miles Mixed " " (75%)	897,790	176,995		1,074,785
(75%)	9,835			9,835
Total	$907,625 \\ 83.68$	$\frac{176,995}{16.32}$		1,084,620 100.00

Statement of Passenger Train Mileage, Including Proportion of Mixed and Special Service Train Miles, Year Ending June 30th, 1910.

Passenger Train Miles	Mich. 746,985	Wis. 147,066	Minn. 3,659	Total. 897,710
Mixed " (25%) Special Service Train Miles	3,278			3,278
Passenger	1,358			1,358
Total	751-621 83.30	147,066 16.30	3,659	902,346 100.00

Statement of Passenger Proportion of Michigan Revenue Train Mileage, Year Ending June 30th, 1910.

	Total Michigan revenue train mileage.	Passenger proportion of Michigan revenue train mileage.
Freight Train Miles	897,790 746,985	746.984
Mixed " "	13,113	25% 3,278
Special Service Train Miles	1,358	* * * * *
Total		$750,\!263\\45,\!22$

1743 Duluth, South Shore & Atlantic Railway Company.

Statement of Revenue Train Mileage, Year Ending June 30th, 1911.

Entire Line.

	Mich.	Wis.	Minn.	Total.
Freight Train Miles	818,325	183,538		1,001,863
Passenger " "	764,277	149,738	3,544	917,559
Mixed " "	90			90
Special Service Train Miles	2,668	411	3	3,082
Total	1,585,360	333,687	3,547	1,922,594
Per cent		17.36	. 18	100.00

1744 Duluth, South Shore & Atlantic Railway Company.

Statement of Freight Train Mileage, Including Proportion of Mixed and Special Service Train Miles, Year Ending June 30th, 1911.

Entire Line.

	Mich.	Wis.	Minn.	Total.
Freight Train Miles	818,325	183,538		1,001,863
Mixed " " (75%) Special Service Train Miles	67			67
Freight	313			313
Mixed (75%)	1,195	225		1,420
Total	819,900 81.69	183,763 18.31		1,003,663 100.00

Statement of Passenger Train Mileage, Including Proportion of Mixed and Special Service Train Miles, Year Ending June 30th, 1911.

Entire Line.

Passenger Train Miles Mixed " " (25%) Special Service Train Miles	Mich. 764,277 23	Wis. 149,738	Minn. 3,544	Total. 917,559 23
Passenger	$\begin{array}{c} 762 \\ 398 \end{array}$	$\frac{111}{75}$	3	876 473
Total	765,460 83.30	149,924 16.31	3,547	918,931 100.00

1745 Duluth, South Shore & Atlantic Railway Company.

Statement of Passenger Proportion of Michigan Revenue Train Mileage, Year Ending June 30th, 1911.

Michigan.

	Total Michigan revenue train mileage.	Passenger proportion of Michigan revenue train mileage.
Freight Train Miles	818,325 764,277 90	764,277 25% 764,277
Fre dht	313 762 1,593	762 25% 398
Total Per cent	$\substack{1,585,360\\100.00}$	765,460 48,28

1746 Duluth, South Shore & Atlantic Railway Company.

Statement of Revenue Train Mileage, Year Ending June 30th, 1912.

Entire Line.

	Mich.	Wis.	Minn.	Total.
Freight Train Miles Passenger " " Special Service Train Miles	732,293	$\substack{181,350\\152,605\\422}$	3,426	981,340 888,324 3,331
Total Per cent	1,535,187 81.97	334,377 17.85	3,431	1,872,995 100.00

1747 Duluth, South Shore & Atlantic Railway Company.

Statement of Freight Train Mileage, Including Proportion of Mixed and Special Service Train Miles, Year Ending June 30th, 1912.

Entire Line.

	Mich.	Wis.	Minn.	Total.
Freight Train Miles Special Service Train Miles	799,990	181,350		981,340
Freight	448			448 935
Mixed (75%)	921	14		900
Total	801,359	181,364	****	982,723
Per cent	81.54	18.46		100.00

Statement of Passenger Train Mileage, Including Proportion of Mixed and Special Service Train Miles, Year Ending June 30th, 1912.

Entire Line.

	Mich.	Wis.	Minn.	Total.
Passenger Train Miles	732,293	152,605	3,426	888,324
Special Service Train Miles Passenger Mixed (25%)	$1,\!228$ 307	404 4		1,637 311
Total	733,828 82.43	153,013 17,19	3,431	890,272 100.00

1748 Duluth, South Shore & Atlantic Railway Company.

Statement of Passenger Proportion of Michigan Revenue Train Mileage, Year Ending June 30th, 1912.

Michigan.

	Total Michigan revenue train mileage.	Passenger proportion of Michigan revenue train mileage.
Freight Train Miles	799,990	*****
Passenger " "	732,293	732,293
Special Service "		
Freight	448	
Passenger	1,282	1,228
Mixed		25% 307
Total	1,535,187	733,828
Per cent	100.00	47.80

1749 COMPLT.'S Ex. No. 35, DELF, Oct. 4, '12.

Filed February 1, 1917, at — o'clock, —. M. Elmer W. Voorheis, Clerk, by Carrie Davison, Deputy Clerk,

4117.

Duluth, South Shore & Atlantic Railway Company.

Operating Revenues, Year Ended June 30th, 1910.

	Entire line.	Michigan.
Freight Rev	2,138,750.60	1,906,529.05
Switching "	17,203.18	14,955.10
Misc. Frt. "	2,318.58	2,102.22
Storage "	80.96	. 80.96
Car Service	2,262.50	2,045.25
	2,160,615.82	$\overline{1,925,712.58} = 66.99\%$
Pass, Train Rev	1,115,922.80	947,817.04
Spl. " "	705.50	705.50
Station & Train Privileges	524.20	436.49
Storage—Baggage	23.95	23.95
	1,117,176.45	948,982.98 = 33.01%
Telegraph Serv. Rev	520.84	486,35
Rents of Bldg. etc	8,469.15	8,165.65
Miscellaneous	4,845.96	4,842.12
	13,835.95	13,494.12
Joint Facilities-Dr	26.00*	26.00*
" " —Cr	10,544.81	8,438.82
	10,518.81	8,412.82
	3,302,147.03	2,896,602.50

^{[*}In red in copy.]

1750 Duluth, South Shore & Atlantic Railway Company.

Operating Revenues, Year Ended June 30th, 1911.

	Entire line.	Michigan.
Freight Rev	2,012,584.00	1,765,815.20
Switching "	13,774.68	11,098.38
Mise. Frt. "	2,318.83	2,191.17
Spl. Train "	3,299.61	2,835.58
Storage "	173.76	161.30
Car Service	$2,\!689.40$	$2,\!370.15$
	2,034,840.28	$\overline{1,784,471.78} = 65.77\%$
Pass. Train Rev	1,085,777.18	926,681.87
Spl. " "	2,032,43	1,692.41
Station & Train Privileges	675.85	562.84
Storage—Baggage	37.95	37.95
	1,088,523.41	928,975.07 = 34.23%
		100,
Telegraph Serv. Rev	598.98	526.94
Rents of Bldgs. etc	9,543.05	9,262.60
Miscellaneous	4,772.82	4,736.87
	14,914.85	14,526.41
Joint Facilities-Dr	24.00*	24.00*
" —Cr	10,563.62	8,932.77
	10,539.62	8,908.77
	3,148,818.16	2,736,882.03

^{[*}In red in copy.]

1751 Duluth, South Shore & Atlantic Railway Company.

Operating Revenues, Year Ended June 30th, 1912.

	Entire line.	Michigan.	
Freight Revenue	2,061,096.00	1,829,175.98	
Switching "	10,716.26	8,390.59	
Miscl. Freight Revenue	2 254 40	3,114.75	
Special Train "	2,889.50	2,864.30	
Storage-Freight "	112.25	110.83	
Car Service "	3,785.60	3,562.10	
Total Freight Rev-	2 001 071 01	1.045.010.55	07 000
enue	2,081,854.01	1,847,218.55	= 67.00%
Pass. Service Train Rev-	1,044,809.06	903,986.02	
enue Special Service Train Rev-	1,044,000.00	303,300.02	
special service Train nev-	3,088,00	2,701.37	
enue	600.00	494.54	
Storage—Baggage	23.75	23.75	
Total Passenger Revenue	1,048,520.81	907,205.68 =	= 32.94%
			100.
Telegraph Serv. Revenue Rents of Bldgs. & Other	620.72	610.14	
Prop	8,967.05	8,638.55	
Miscellaneous	4,618.26	4,568.38	
Total	14,206.03	13,817.07	
Joint Facilities-Dr	24.00*	24.00*	
" "—Cr	7,918.18	6,640.13	
	7,894.18	6,616.13	
Total Operating Revenue		2,774,857.43	

[*In red in copy.]

1752

Filed February 1, 1917, at - o'clock - M. Elmer W. Voorheis, Clerk, by Carrie Davison, Deputy Clerk. COMPLT.'8 EX. No. 36, DELF, OCT. 7", 1912. 4117.

Duluth, South Shore & Atlantic Railway Company.

Operating Revenue, Year Ended June 30th, 1910.-Michigan.

	23.95 23.95	948,982.98 = 33.01%	.48	.46
Passenger	947	948,982	7,231.48	956,214.46
Freight. 1,906,529.05 14,955.10 2,102.22 80.96 2,045.25	$\frac{1,925,712.58}{} = 66.99\%$		14,675.46	1,940,388.04
Total. 1,906,529.05 14,955.10 2,102.22 80.96 2,045.25	947,817.04 705.50 436.49 23.95	2,874,695.56 486.35 8,165.65 4,842.12 8,412.82	21,906.94	2,896,602.50 1,940,388.04
Freight Revenue Switching Misc. Frt. Storage—Frt. " Car Service	Pass, Train Rev. Special Train Rev. Station & Train Priv. Storage Baggage	Total Frt. & Pass. Rev. Telegraph Serv. Rev. Rents of Bldgs. etc. Miscellaneous Joint Facil. (Bal.)	Frt. 66.99%. Pass. 33.01%.	Total Operating Revenue

Duluth, South Shore & Atlantic Railway Company. Operating Revenues, Year Ending June 30th, 1911.

Michigan.

	,			928,975.07 (34.23%)			
	Passenger.		926,681.87 1,692.41 562.84 37.95	928,975.07		8,021.86	936,996.93
Assigned to-			(65.77%)				
	Freight.	1,765,815.20 11,098.38 2,191.17 2,835.58 161.30 2,270.15	1,784,471.78 (65.77%)			15,413.32	1,799,885.80
	Total.	1,765,815.20 11,098.38 2,191.17 2,835.58 161.30 2,370.15	926,681.87 1,692.41 562.84 37.95	2,713,446.85	526.94 9,262.60 4,736.87 8,908.77	23,435.18	2,736,882.03 1,799,885.80
		Freight Revenue Switching " Misc. Freight Revenue Special Train " Storage Car Service "	Passenger Train Revenue Special Station & Train Privileges Storage—Baggage	Total Frt. & Passr. Rev	Telegraph Serv. Revenue	Frt, 6577%—Pass, 34.23%.	Total Operating Revenue

1754

y Company.	th. 1912.
Railway	June 30
Duluth, South Shore & Atlantic Railway	ar Ended
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th Shore	evenues.
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Duluth, 8	Onerating Revenues. Year Ended June 30th, 1912.

Michigan.

Assigned to-

		~	
Freight Revenue Switching Misc. Frt. Storage—Frt. Car Service Special Train Rev.	Total. 1,829,175.98 8,390.59 3,114.75 110.83 3,562.10 2,864.30	Freight. 1,829,175.98 8,390.59 3,114.75 110.83 3,562.10 2,864.30	Раввепкет.
Pass. Train Rev. Special Train Rev. Station & Train Priv. Storage Baggage	903,986.02 2,701.37 494.54 23.75	$1,847,218.\overline{55} = 67.06\%$	8 903,986.02 2,701.37 494.54 23.75
Total Frt. & Pass. Rev Telegraph Serv. Rev. Rents of Bldgs., etc. Miscellaneous Joint Facil. Bal.	2,754,424.23 610.14 8,638.55 4,568.38 6,616.13		907,205.68 = 32.94%
Frt. 67.06%. Pass. 32.94%.	20,433.20	13,702.51	6,730.69
Total Operating Revenue	2,774,857.43 1,860,921.06	1,860,921.06	913,936.37

1755 COMPLT.'s Ex. No. 43, Delf, Oct. 8", 1912.

Filed February 1, 1917, at — o'clock —. M. Elmer W. Voorheis, Clerk, by Carrie Davison, Deputy Clerk.

4117.

Duluth, South Shore & Atlantic Railway Co.

In Michigan.

	Number of passengers.	Passengers one mile.	Average haul.	Rate per pass. per mile.
1902	. 527,548	27,730,780	52.57	.02760
1903		29,579,008	50.28	.02840
1904		27.415.002	49.53	.02815
1905	. 509,857	26,401,713	51.78	.02762
1906	567,520	28,697,476	50.57	.02825
1907		33,256,965	52.74	.02785
1908		32,438,206	52.33	.02590
1909		31,145,196	48.61	.02541
1910		32,813,258	47.59	.02543
1911		32,677,027	45.70	.02519
1912		31,574,678	43.99	.02551
		Intrastate.		
1910	588,745	18,358,957	31.18	.02563
1911		19,645,802	31.60	.02558
1912		20,090,114	31.96	.02604
		Interstate.		
1910	100,758	14,454,301	143.46	.02518
1911	93,453	13,031,225	139.44	.02460
1912	89,176	11,484,564	128.79	.02458

1756 Duluth, South Shore & Atlantic Railway Co.

Entire Line.

	Number of passengers.	Passengers one mile.	Average haul.	Rate per pass per mile.
1902	581,668	32,816,802	56.42	.02692
1903		35,327,390	55.10	.02733
1904	. 603,308	33,388,599	55.34	.02654
1905	. 554,093	31,019,854	55.98	.02673
1906	. 618,337	34,413,938	55.66	.02694
1907	. 691,585	40,284,349	58.25	.02662
1908	. 679,253	39,627,046	58.34	.02446
1909	. 707,653	37,924,125	53.59	.02413
1910	. 719,169	40,128,377	55.80	.02463
1911	. 785,622	39,484,915	50.26	.02452
1912	. 790,239	37,653,013	47.65	.02469

1757

COMPLE,'S EX. NO. 52, DELF, JAN. 8", 1913. D. L.

Filed Feby. 1, 1917, at - o'clock -- M. Elmer W. Voorheis, Clerk.

4117.

Ex. 52.

Duluth, South Shore & Atlantic Railway Co. in Michigan.

Estimated Loss by Application of Act 276.

Adults 2¢ per mile. \$359,491.18 Children 1¢ ". 3,843.98
\$363,335.16
Amount in excess of 2¢ per mile that could be obtained from fares of five miles or less.
Amount in excess of 2¢ per mile that could be obtained on certain business via Negaunee and Champion
Total \$365,075.36 Amount that was received under Three Cent Rate. 470,580.29
Loss 1910.

Duluth, South Shore & Atlantic Railway Co. in Michigan.

Estimated Loss by Application of Act 276.

Year 1911.			
Amount that could be obtained under a Two Cent Rate, except on fares of five miles or less and certain fares via Negaunee and Champion included herein on which more than two cents could be obtained, as shown below:	Intrastate.	Interstate.	Total.
Adults 2¢ per mile	\$385,233.62 3,841.21	\$253,962.68 3,330.91	\$639,196.30 7,172.12
	\$389,074.83	\$257,293.59	\$646,368.42
Add: Amount in excess of 2¢ per mile that could be obtained from fares of five miles or less.	2,017.56	:	2,017.56
Amount in excess of 2¢ per mile that could be obtained on certain business via Negaunee and Champion.	125.59	4,090.13	4,215.72
Total Amount that was received under Three Cent Rate.	\$391,217.98 502,511.08	\$261,383.72 320,614.73	\$352,601.70 823,125.81
Loss 1911	\$111,293.10	\$59,231.01	\$170,524.11

1758

1759

Duluth, South Shore & Atlantic Railway Co. in Michigan.

Estimated Loss by Application of Act 276.

Year 1912.

Amount that could be obtained under a Two Cent Rate, except on farcs of five miles or less and certain fares via Negaunee and Champion included herein on which more than two cents could be obtained, as shown below:	Intrastate.	Interstate.	Total.
Adults 2¢ per mile.	\$394,449.98 3,676.15	\$223,860.66 2,915.31	\$518,310.64 6,591.46
	\$398,126.13	\$226,775.97	\$524,902.10
Amount in excess of 2¢ per mile that could be obtained from fares of five miles or less.	1,825.78	:	1,825.78
tain business via Negaunee and Champion	96.71	4,396.70	4,493.50
Total	\$400,048.62 523,146.59	\$231,172.76 282,385.90	\$631,221.38 805,532.49
Loss 1912	\$123,097.97	\$51,213.14	\$174,311.11

Duluth, South Shore & Atlantic Railway Co.

1760

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	Total.	674,090	689,503	32,100,488 712,770	32,813,258	\$825,503.16 9,027.00	\$834,530.16	699,518 15,563	715,081	31,959,815 717,212	32,677,027
& Chudren.	Interstate.	98,623 2,135	100,758	14,125,929 328,372	14,454,301	\$360,072.44 3,877.43	\$363,949.87	91,226 2,227	93,453	12,698,134 333,091	13,031,225
ed as Between Adults	Intrastate.	575,467 13,278	588,745	17,974,559 384,398	18,358,957	\$465,430.72 5,149.57	\$470,580.29	$608,292 \\ 13,336$	621,628	19,261,681 384,121	19,615,802
Passenger Traffic in Michigan Divided as Between Adulis & Unidiren.		: Adults	Total	Adults	Total			Adults	Total	Adults	Total
	Year 1910:	Number of Passengers: Adults . Children	29	Passengers One Mile:	22 22	Revenue: Adults	" Total	Year 1911: Number of Passengers:	77	Passengers One Mile:	"

Duluth, South Shore & Atlantic Railway Co.

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			Intrastate.	Interstate.	Total.
Revenue:	Revenue: Adults Children .		\$497,305.04 5,206.04	\$316,656.86 3,957.87	\$813,961.90 9,163.91
***	Total		\$502,511.08	\$320,614.73	\$823,125.81
Ye	Year 1912:				
Number o	Number of Passengers: Adults passengers: Childre	Adults	618,483 10,110	87,451 1,725	705,934 11,835
3	3	Total	628,593	89,176	717,769
Passenger	Passengers One Mile:	Adults Children	19,722,499 367,615	$11,193,033 \\ 291,531$	30,915,532 659,146
7	99	Total	20,090,114	11,484,564	31,574,678
Revenue:	Adults Children .		\$517,924.64 5,221.95	\$278,809.93 3,575.97	\$796,734.57 8,797.92
99	Total		\$523,146.59	\$282,385.90	\$805,532.49

1761 COMPLT.'s Ex. No. 53, Delf, Jan. 8, 1913. D. L. C.

Filed Feby. 1, 1917, at — o'clock —. M. Elmer W. Voorheis, Clerk.

4117.

Ex. 53, Delf.

Duluth, South Shore & Atlantic Railway Company.

Population of the State of Michigan from Census of 1910.

Entire State		 			 								2,810,173
Northern Peninsula													325,628
Southern "	9					 			 				2,484,545

Railroad Mileage from Report of the Michigan Railroad Commission 1910, Pages 210 and 211.

	Entire State.	Northern peninsula.	Southern peninsula.
Main Line Owned All Tracks " Total Operated		1,491.31 $2,976.65$ $3,328.53$	4,229.66 7,390.73 9,942.23
Population per mile of:	Entire State.	Northern peninsula.	Southern peninsula.
Main Line Owned (1910) All Tracks " Total Operated "	491 271 211	218 109 98	587 336 249

1762

COMPLT.'s Ex. No

Duluth, South 8

Stateme

Ex.	54
LAA.	OX.

		Gross earnings.	Operating expenses.	Net earnings.	Oth
Year ended Dec. 31,	1887	1,465,689,23	861,730.89	603,958.34	***
	1888	1,468,592.16	883,798,06	584,794.10	8,3
	1889	1,976,350.38	1,146,876.12	829,474.26	2.8
	1890	2,241,097.12	1,422,703.81	818,393.31	1.1
	1891	2,160,118.24	1,332,292.34	827,825,90	***
	1802	2,249,194.25	1,484,695,20	764,499.05	
	1893	2,078,777.54	1,474,754.88	604,022.66	10.1
	1894	1,670,987.00	1,094,238,81	576,748.19	3,7
	1895	1,811,823.03	1,121,503.33	690,319.70	55,0
	1896	1,905,810.53	1,234,679.67	671,130.86	32,4
	1897	1,591,114.88	1,064,723.70	526,391.18	20,6
	1898	1.821.807.59	1,224,045,79	597,761.80	5.4
	1899	2,407,437.39	1,468,896.17	938,541,22	4.9
	1900	2,557,973,46	1,628,839.21	929,134,25	5,4
Jan. 1st to June 30,	1901	1,168,524.26	790,821.51	377,702,75	4.0
Year ended June 30,	1902	2,690,569.36	1.688,818.38	1.001,750.98	6,2
	1903	2,772,134.67	1,758,089.74	1.014.044.93	14.6
	1904	2.524,612.07	1,749,456,12	775,155.95	11.4
	1905	2,706,936.02	1,852,705.09	854,230.93	15.6
	1906	3,057,775.40	2,057,459.76	1.000,315.64	9,1
	1907	3,311,878.06	2,320,857.89	901,020.17	8,9
	1908\$	2,986,958.38x	2,252,786.68	734,171.70	30,4
	1909\$	2,785,586.83x	2,037,900.83	747,686.00	146,2
	1910\$	3,372,089.65x	2,330,599.63	1,041,490.02	50,6
	1911:	3,219,861.55x	2,330,955.87	888,905.68	249,5
	19123	3,224,906.58x	2,464,234.01	760,672.57	39,2
	(61,228,605.63	41,078,463.49	20,150,142.14	736,3

[Endorsed:] 4117. Filed Feby. 1, 1917, at - o'clock -

DELF, JAN. 8", 1913.

& Atlantic Ry. Co.

Operations.

Ex. 54.

		434. 04.		
Total income.	Taxes accrued.	Interest on bonds.	Other deductions from income.	Profit or loss,
003,958.34	31,091.57	265,758.07	175,919.68	131,189.02
566,100.43	36,158,48	440,072.00	196,707.31	79,837.36*
832,312.26	36,956.25	519,352.00	329,670.57	53,666.56*
819,551.31	43,844.95	519,012.00	313,417.86	56,723.50*
827,825,90	44,825,90	516,932.00	253,692,62	12,375.38
764,499.05	44,569.61	671,704.54	165,716.63	117,491.53*
614,158, 17	42,846.18	870,166.66		298,854.67*
580,535 . 67	44,024.97	868,000,00	2,950.10	334,439,40*
745,395.70	35,601.65	866,385.00	26,735.86	183 326.81*
702,533.06	38,462.47	861,098.34	856.47	196,884,22*
546,998.74	41,031.71	860,168,33	7,953.78	362,155.08*
003,179.71	41,754.84	859,616.67		298,191.80*
943,478.53	53,653,43	859,700.00	16,067.66	14.057.44
\$4,580.70	78,990.27	859,700.00		4.109.57*
381,753.18	80,344.42	429,850.00	393.45	128,831,69*
1008,036,20	128,008.92	859,700.00		20,327.28
1028,710.13	200,213.67	859,700.00	2,647.00	33,850.54*
786,639.91	210,391.07	859,700.00		283,451.16*
809,881.28	216,733.73	859,700.00		206,552.45*
1009,428.52	292,471.22	859,700.00	13,593,40	156,336.10*
999.950.65	170,282.84	859,700.00	25,503.76	55,535,95*
			Dep. 35,539,30	
764,576.92	186,345.24	859,700.00	39,653.56	356,661.18*
			" 28,204.21	
803,894.67	203,599.70	859,700.00	32,418.53	230,027.77*
			" 184,628.63	
1002,148.16	225,917.63	859,700.00	173,616.86	351,714.96*
			" 19,340.81	
U38,475.37	215,179.79	859,700.00	112,673.78	68,419.01*
			" 41.675.42	
30,911.18	217,417.86	859,700.00	93,352.98	412,235.08*
M6,513.74	2,960,718.37	19,724,215.41	2,292,930.23	4,091,350.27*

M. Mer W. Voorheis, Clerk.

1763 Duluth, South Shore & Atlantic Railway Co.

Capital Stock

Statement of Resources and Disposition from Jan. 1st, 1887, to June 30th, 1912.

Resources.

First Mortgage 5% Bonds 4,000,000.00

...... 22,000,000.00

Consol. " 4% "		15,107,000.00
M. H. & O. Bonds		4,856,700.00
Income Certificates, 4%		3,000,000.00
Car Trust Obligations		2,126,624.73
Total Income		20,886,513.74
Total Resources		71,976,838.47
Disposition.		
Road & Equipment 47,13	82,526.58	
Less Reserve for Accrued Deprecia-	20 217 42	
	20,217.42	46,762,309.16
Investments		1,423,154.84
Paid Interest on Bonds		12,631,201.90
" Interest on Unfunded Debt, Car		12,001,201.00
Miscel, Int.		892,869.58
" Rents		192,586.32
" Taxes		2,853,718.37
" Pro. Exp. Mackinac Trans. Co		107,066.06
To. Lap. Macking Times. Co		201,000.00

Dividends on M. H. & O. Pref. Stock

Refund to Mineral Range R. R. Co. account Equipment Rental

Accounts Written Off

Loss on Tracks and Buildings abandoned

Depreciation prior to June 1st, 1907 on Equipment destroyed since that date

First Mortgage 5% Bonds retired

M. H. & O. Bonds retired

Car Trust Obligations retired

71,652,906.04

673,176.24

48,399.44

37,113.18

29,811.04

309,388.37

184,000.00 3,779,700.00

1,728,411.54

Current Accounts.

Current Accounts.	
Cash on hand 149,193.34 Material on hand 342,563.35 Due from Agents & Conductors 102,164.01 Miscellaneous Accounts Receivable 217,297.89 Deposits with Trustees of Car Trusts, etc. 28,353.33 Insurance Paid on Advance 797.50	
Unpaid Vouchers and Wages	323,932.43
Total Disposition	976 838 47
1764 Duluth, South Shore & Atlantic Railway Co).
Statement of Investments from Jan. 1st, 1887, to June	30th, 1912.
Mackinac Transportation Co. Sault Ste. Marie Bridge Co. Lake Superior Terminal & Transfer Ry. Co.— Stock	250.00
Mineral Range R. R. Stock Sainte Marie Union Depot Co.— Stock 37,500.00 Advances 21,279.86	751,995.00
South Shore Land Co. Stock Mineral Range R. R. Equip. Notes Duluth Board of Trade Membership	58,779.86 3,000.00 198,754.61 70.00
Other Properties:	
Rails and Fastenings loaned to— Edw. Hines Lumber Co. Holt Lumber Co. Lake Sup. Iron & Chemical Co. Claussen Bros. Gladstone Lots House & Lot, Ridge St., Marquette, Mich. Miscellaneous	25,824.02 17,451.79 28,977.84 924.21 10,130.00 6,900.00 3,625.81
Total	,423,154.84

1765 COMPLT.'s Ex. No. 55, DELF, JAN. 8", 1913. D. L. C.

Filed Feby. 1, 1917, at - o'clock - M. Elmer Voorheis, Clerk.

Ex. 55.

4117.

Five-year View of Railroad Income per Mile-

	Gross operating income (taxes not out), 1908–1912.	Net operating income (taxes not out), 1908–1912.	Av. mileage operated, 1908–1912.
C. & N. W. Ry	9,144.00	2,841.00	7,695
C. M. & St. P. Ry	8,245.00	2,506.00	7,509
C. R. I. & P. Ry	7,939.00	2,236.00	8,020
C. St. P. M. & O. Ry	8,349.00	2,799.00	1,737
Gt. Nor. Ry	8,597.00	3,366.00	7,007
Ill. Cent. Ry	12,429.00	3,166.00	4,569
No. Pac. Ry	11,774.00	4,828.00	5,809
Wabash R. R	11,034.00	2,790.00	2,515
D. S. S. & A. Ry	5,048.00	1,377.00	606

1766 Five-Year View of Railroad Operating Expense Ratios.

	Total operat- ing expense ratios, 1908–1912.	Condg. transf. & traffic exps. ratios, 1908–1912.	Maint. of way & structs. ratios, 1908–1912,	Maint. of equip. ratios, 1908–1912.
C. & N. W. Ry	. 68.78%	41.72%	13.25%	12.12%
C. M. & St. P. Ry.		42.17%	12.63%	13.10%
C. R. I. & P. Ry	. 71.68%	41.62%	14.50%	12.89%
C. St. P. M. & O. Ry	. 66.47%	40.35%	12.24%	11.76%
Gt. Nor. Ry	. 60.84%	30.00%	16.73%	12.33%
Ill. Cent. Ry		38.46%	12.60%	21.22%
Nor. Pac. Ry	. 59.00%	32.91%	12.75%	11.81%
Wabash R. R	. 74.71%	43.36%	12.23%	16.31%
D. S. S. & A. Ry	. 73.01%	41.43%	17.22%	11.58%

Figured on average mileage operated.

1767 COMPLT.'s Ex. No. 67, Delf, Jan. 29", 1914.

Filed Feby. 1, 1917, at — o'clock — M. Elmer W. Voorheis, Clerk.

Duluth, South Shore & Atlantic Railway.

Statement of Revenue Train Mileage, Year Ending June 30th, 1913.

Entire Line.

	Mich.	Wis.	Minn.	Total.
Freight Train Miles	852,914	194,394		1,047,308
Passenger " "	760,891	155,517	3,513	919,921
Mixed " " Special Service Train Miles	$\frac{14,570}{3,115}$	343	3	14,570 3,461
Total	1,631,490 82.18	350,254 17.64	3,516	1,985,260 100.00

1768 Duluth, South Shore & Atlantic Railway Company.

Statement of Passenger Proportion of Michigan Revenue Train Mileage, Year Ending June 30th, 1913.

Michigan.

	Total Michigan revenue train mileage.	of Mi	nger proportion chigan revenue ain mileage.
Freight Train Miles	852,914 $760,891$		760,891
Passenger " "	14,570	25%	3,643
Passenger	$\frac{1,442}{1,673}$	25%	1,442 418
Total	1,631,490 100.00		766,394 46.98

Operating Revenue, Year Ended June 30th, 1913, Michigan.	June Soin, 1919,	Assigned to-	1 to
	Total.	Freight.	Passenger.
Freight Revenue	\$1,980,176.94	\$1,980,176.94 9.219.77	
Miscellaneous Rreight Revenue.	2,225.54	2,225.54	
Miscellaneous (Dockage & Handling Iron Ore)	18,412.32 121.35	18,412.32	
Car Service Special Train Revenue	4,435.90 2,964.29	4,435.90 2,964.29	
		2,017,556.11	
Passenger Train Revenue.	941,015.90 2.970.56		941,015.90
Station & Train Privileges	496.24		496.24
Total Freight & Pass. Revenue	2,962,088.01		944,531.90
Rents of Buildings, etc. Miscellaneous Joint Facilitiee (Balance)	686.71 10,158.50 4,978.34 2,894.95		9,50.10
Preight, 68.11%; Pass., 31.89%.	18,718.50	12,749.17	5,969.33
Total Operating Revenue	2,980,806.51	2,030,305.28	950,501.23

Year Ended June 30th, 1913.

In Michigan.

Number of passengers.	Passengers one mile.	Average haul.	Rate per passenger per mile.
760,252	33,158,849	43.64	.02538
	Intrasta	ate.	
669,350	21,744,820	32.48	.02578
	Intersta	ate.	
90,902	11,414,029	125.56	.02462
	Entire I	Line.	
842,073	39,528,611	46.94	.02460
			* *

COMPLAINANT'S EXHIBIT 68, DELF.

1771

Duluth, South Shore & Atlantic Railway Company.

In Michigan.

Estimated Loss by Application of Act 276.

Year 1913.			
Amount that could be obtained under a Two Cent Rate, except on fares of five miles or less and certain fares via Negaunee and Champion included herein, on which more than two cents could be ob-	Intrastate.	Interstate.	Total.
Adults, 2¢ per mile	\$426,379.14 4,258.63	\$222,448.04 2,916.27	\$648,827.18 7,174.90
Add:	\$430,637.77	\$225,364.31	\$656,002.08
Amount in excess of 2¢ per mile that could be obtained from fares of five miles or less.	1,930.06	:	1,930.06
tain business via Negaunee and Champion	180.88	4,885.66	5,066.54
Total	\$432,748.71	\$230,249.97	\$662,998.68
Amount that was received under Three Cent Rate	560,539.36	280,995.40	841,534.76
Loss 1913	127,790.65	\$50,745.43	\$178,536.08

1772 Duluth, South Shore & Atlantic Railway Company.

Statement of Children's Fares in Michigan, Year Ended June 30th, 1913.

Number of passengers.	Michigan state.	Michigan -	Michigan total.
Cash Fares	2,420	17	2.437
Legal Tickets		307	
Local Tickets	9,772		10,079
D. S. S. & A. Coupon Tickets	1,879	998	2,877
Foreign " "	817	797	1,614
All Tickets	14,888	2,119	17,007
Passengers one mile.	Michigan state.	Michigan interstate.	Michigan total.
Cosh fares	49,148	1,783	50,931
Local Tickets	188,187	43,294	231,481
D. S. S. & A. Coupon Tickets	126,689	146,377	273,066
Foreign " "	61,839	100,173	162,012
All Tickets	425,862	291,627	717,490
Revenue.	Michigan state.	Michigan interstate.	Michigan total.
Cash Fares	718.82	27.43	746.25
Local Tickets	2,487.86	509.70	2,997.56
D. S. S. & A. Coupon Tickets	1,773.36	1,675.51	3,448.87
Foreign " "	845.47	1,208.59	2,054.06
All Tickets	5,824.51	3,421.23	9,246.74
Per Pass. Mile	.0137	.0117	.0129
If @ .02¢ per mile	8,517.26	5,832.54	14,349.80
Difference	2,691.75	2,411.31	5,103.36

1773 Duluth, South Shore & Atlantic Railway Company.

Passenger Traffic in Michigan, Year Ended June 30th, 1913.

Statement of Number of Passengers, and Revenue, Traveling Distance of Five Miles or Less.

	No. Pass.	Revenue.
Cash Fares	26,493	\$2,558.93
Local Tickets	28,629	3,081.40
Mileage	1,001	103.00
D. S. S. & A. and Foreign Coupon Tkts	556	46.84
Total	56,679	\$5,790.17
One-third =		\$1,930.06

Statement of Traffic Interchanged with Connecting Roads at Negaunee and Champion on which More than Two Cents per Passenger Mile Could Be Obtained.

Year 1913.

Number of passengers:	Intrastate.	Interstate.	Total.
Full fare		12,720	13,194
Half fare	4	274	278
Excess revenue above 2¢ per mile	\$180.88	\$4,885.66	\$5,066.54

(Here follow insert tables 201 A, 201 B, and 201 C, marked pages 1774, 1775, and 1776.)

PLFF. Ex. 220. C. S. C.

Duluth, South Shore & Atlantic Ry. Co.

Statement of Operations in Michigan, Year Ended June 30, 1914.

	Total Mich.	Freight.	Passenger.
Total Operating Révenue (Ex. 202, p. 6)	\$2,954,875	\$1,895,905	\$1.058,970
Sleeping Car Revenue (Ex. 206, p. 5)	30.482	4210001000	30,482
Dining Car Revenue (Ex. 206, p. 5)	34,966		34,966
Rents RecdJoint Facilities (Ex. 206,			
p. 5)	10,972	2,579	8,393
Interest	4,987	3,193	1,794
Total Mich. Income	\$ 3,036,282	\$1,901,677	\$1,134,605
Operating Expenses (Ex. 206, p. 4)	\$2,288,975	\$1,536,488	\$752,487
Sleeping Car Expenses (Ex. 206, p. 5)	18,540	******	18,540
Dining Car Expenses (Ex. 206, p. 5)	44.076	******	44.076
Rents Paid-Joint Facil. (Ex. 202, p. 11)	9.882	7,503	2,379
Rents Paid Miscel. (Ex. 202, p. 10)	101	101	
Hire of Equip. Dr. Bal. (Ex. 202, p. 10)	28,435	27.163	1.272
Separately Operated Prop. (M. T. Co.		21,103	1,272
Ex. 202, p. 6)	24,149	24,149	
р. 12)	204,255	140,875	63,380
	\$2,618,413	\$1,736,279	\$882,134
Net Income, Mich	\$417,869	\$165,398	\$252,471
Percentage on valuation of 1917	0.914	4 000	4 80-4
Percentage on variation of 1917	2.31%	1.32%	4.53%
Percentage " of 1913	3.00%	1.71%	6.00%
Estimated Loss	196,046		196,046
Net Income after deducting Esti-			
mated Loss	\$221,823	\$165,398	\$56,425
Percentage on Val. of 1917	1.23%	1.32%	1.01%
" 1913	1.60%	1.71%	1.34%
1778			
Val. 1917—Frt			919 500 611
Page		********	\$12,500,644
Pass	*********	********	5,569,514
			\$18,070,158
Val. 1913—Frt	****		\$9,695,721
Pass			
			4,206,217
			\$13,901,938

1779 Duluth, South Shore & Atlantic Ry. Co.

Statement of Operations in Michigan, Year Ended June 30, 1915.

Total Mich.	Freight.	Passenger.
\$2,569,095	\$1,006,094	\$903,001
0.00%	# 00F	2.160
	50.6	
		13,893
2,937	1,902	1,035
\$2,000,973	\$1,680,884	\$920,089
\$1,962,631	\$1,245,380	\$717,251
3,495	1.636	1.859
	7.159	1,893
42	42	******
16,048	16,048	******
77	******	77
38		38
	140,452	63,190
\$2,195,025	\$1,410,717	\$784,308
\$405,948	\$270,167	\$135,781
9 95%	9 16%	2.44%
	2.79%	3.23%
. 167,535		167,535
1		
	\$270,167	*\$31,754
1.32%	2 1005	0
	2.79%	0
	\$2,569,095 8,027 20,914 2,937 \$2,000,973 \$1,962,631 3,495 9,052 42 16,048 77 38 203,642 \$2,195,025 \$405,948 2,25% 2,92% 167,535 4 \$238,413 1,32%	\$2,569,095 \$1,006,094 8,027 5,867 7,021 2,937 1,902 \$2,937 1,902 \$2,000,973 \$1,680,884 \$1,962,631 \$1,245,380 3,495 1,636 9,052 7,159 42 42 42 16,048 16,048 77

^{[*}In red in copy.]

1780 Duluth, South Shore & Atlantic Ry. Co.

Statement of Operations in Michigan, Year Ended June 30, 1916.

	Total Mich.	Freight.	Passenger.
Total Operating Revenue (Ex. 204, p. 8) Rents Received:		\$2,152,115	\$933,296
Hire of Equip. (Ex. 204, p. 12)	14.522	11.494	3.028
Joint Facilities (Ex. 204, p. 12)	19,171	5,589	13.582
Interest (Excluding Int. from rate case		e poor	anyeros
fund)	7,638	5.323	2.315
Total Mich. Income	\$3,126,742	\$2,174,521	\$952,221
Operating Expenses (Ex. 208, p. 4) Rents Paid:		\$1,401,677	\$692,945
Hire of Equip. (Ex. 204, p. 12)	22,444	20.749	1,695
Joint Facilities (Ex. 204, p. 13)	10.610	8,644	1,966
Miscellaneous (Ex. 204, p. 12)	37	37	
Miscellaneous Interest	7	5	9
Separately Operated Properties (M. T.			
Co. Ex. 204, p. 7)	30,048	30,048	
Taxes on Sleeping Car Tickets (Ex. 208.	00,010	00,040	******
p. 5)	168		100
Taxes on Observation Car Tickets (Ex.	100	******	168
208, p. 5)	90		0.0
Taxes paid State of Mich. (Ex. 210,	00	******	90
р. 12)	200,963	138,604	62,359
Total Deductions from Income	\$2,358,989	\$1,599,764	\$759,225
Net Income, Mich	\$767,753	\$574,757	\$192,996
Percentage on Valuation of 1917	4,25%	4.59%	0.45**
Percentage on Valuation of 1913	5.52%		3.47%
	0.02%	5.93%	4.58%
Estimated Loss	176,641	*******	176,641
Net after deducting Estimated			
Loss	\$591,112	\$574,757	\$16,355
Percentage on Val. of 1917	3.27%	4 800	4347
Percentage on Val. of 1913	4.25%	4.59%	.29%
	4.20%	5.93%	.39%

Duluth, South Shore & Atlantic Ry. Co. 1781-2

Statement of Operations in Michigan, Year Ended June 30, 1917.

	Total Mich.	Freight.	Passenger.
Total Operating Revenue (Ex.			
205, p. 7) 3,553,297			
Less			
	\$3,552,182	\$2,505,048	\$1,047,134
Rents Reed.:			
Hire of Equip. (Ex. 205, p. 15)	13,627	10,844	2,783
Joint Facilities (Ex. 205, p. 9)	17,979	4,815	13,164
Interest (Excluding int. on rate case			
fund)	5,820	4,101	1,719
Total Mich. Income	\$3,589,608	\$2,524,808	\$1,064,800
Total area areas	***************************************		-
Operating Expenses (Ex. 200, p. 4)	\$2,541,192	1,750,471	\$790,721
Rent Paid:			
Hire of Equip. (Ex. 205, p. 15)	89,232	87,566	1,666
Joint Facilities (Ex. 205, p. 7)	11,755	10,090	1,665
Miscellaneous (Ex. 205, p. 9)	168	168	
Miscel. Interest	13	9	4
Separately Operated Properties, (M. T.			
Co.) (Ex. 205, p. 8)	27,520	27,520	*******
Taxes on Sleeping Car Tickets (Ex. 209,			
p. 5)	48	******	. 48
Taxes on Observ. Car Tickets (Ex. 200,			
p. 5)	26		26
Taxes paid State of Mich. (Ex. 210,			
p. 12)	187,570	129,367	58,203
Total deductions from Income	\$2,857,524	\$2,005,191	\$852,333
Net Income, Mich	\$732,084	\$519,617	\$212,467
Percentage on Valuation of 1917	4.05%	4.16%	3.82%
Percentage on Valuation of 1913	5.27%	5.36%	5.05%
Estimated Loss	218,234		218,234
Net after deducting Estimated			
Loss	\$513,850	\$519,617	*\$5,707
Percentage on Val. of 1917	2.84%	4.16%	0
Percentage on Val. of 1913	3.70%	5.36%	0

^{[*}In red in copy.]

Summary.

Before deduction of loss 1914 Net 1915 " 1916 " 1917 "	\$417,869 405,948 767,753 732,084	\$165,398 270,167 574,757 519,617	\$252,471 135,781 192,996 212,467
	\$2,323,654	\$1,529,939	\$793,715
Average 4 years	\$580,913	\$382,485	\$198,428
Percentage on Val. of 1917 Percentage on Val. of 1913	$\frac{3.21\%}{4.18\%}$	$\frac{3.06\%}{3.95\%}$	$\frac{3.56\%}{4.72\%}$
Total Net—1914 to 1917 Incl Estimated Loss 1914 to 1917 Incl	\$2,323,654 758,456	\$1,529,939	\$793,715 758,456
4 Years—Net after Estimated Loss	1,565,198	1,529,939	35,259
Average	\$391,299	\$382,485	\$8,814
Percentage on Val. of 1917 Percentage on Val. of 1913	$\frac{2.17\%}{2.81\%}$	$\frac{3.06\%}{3.95\%}$.15% .21%

1783 Ex. 221.

Plaintiff's Computations of Rate of Return on Property Valuation.

	1914.	1915.	1916.	1917.
Value of Intrastate property Net Intrastate Passenger Income	\$3,006,938	\$3,470,498	\$3,307,262	\$3,935,976
before deducting estimated loss Rate of return	$\frac{170,091}{5.66\%}$	$102.544 \\ 2.95\%$	$\substack{133,078 \\ 4.02}$	$138,055 \\ 3.51\%$
Net Intrastate Passenger Income after deducting estimated loss Rate of return	\$38,392 1.29%	Loss 22,636	\$7,188 ,22%	Loss 11,693

Endorsed on cover: File No. 26,845. E. Michigan D. C. U. S. Term No. 759. Alex J. Groesbeck, Cassius L. Glasgow, Charles S. Cunningham, and Addison A. Keiser, appellants, vs. Duluth, South Shore & Atlantic Railway Company. Filed December 4th, 1918. File No. 26,845.